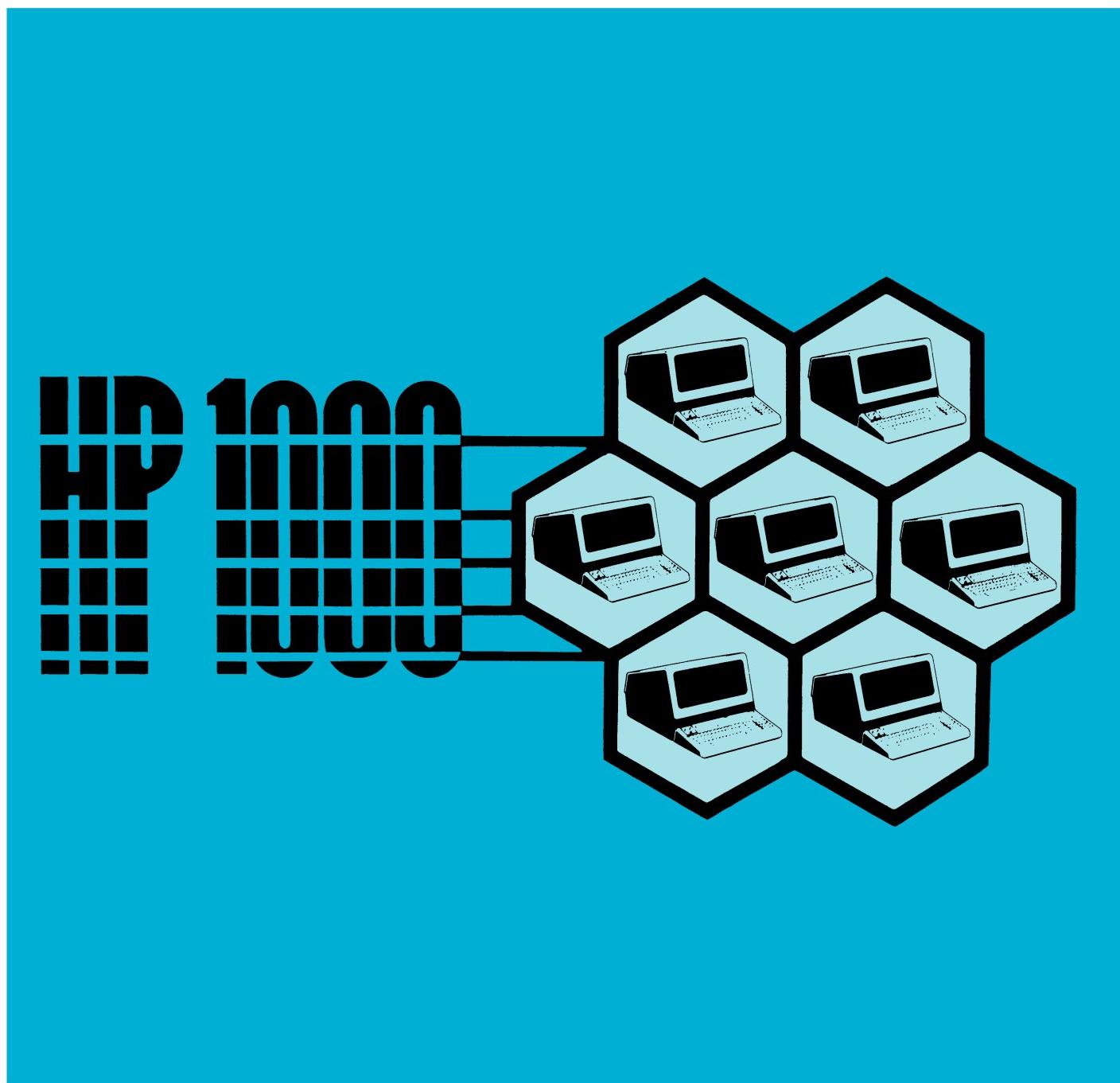




HP 92068A

RTE-IVB On-Line Generator

Reference Manual



RTE-IVB On-Line Generator Reference Manual



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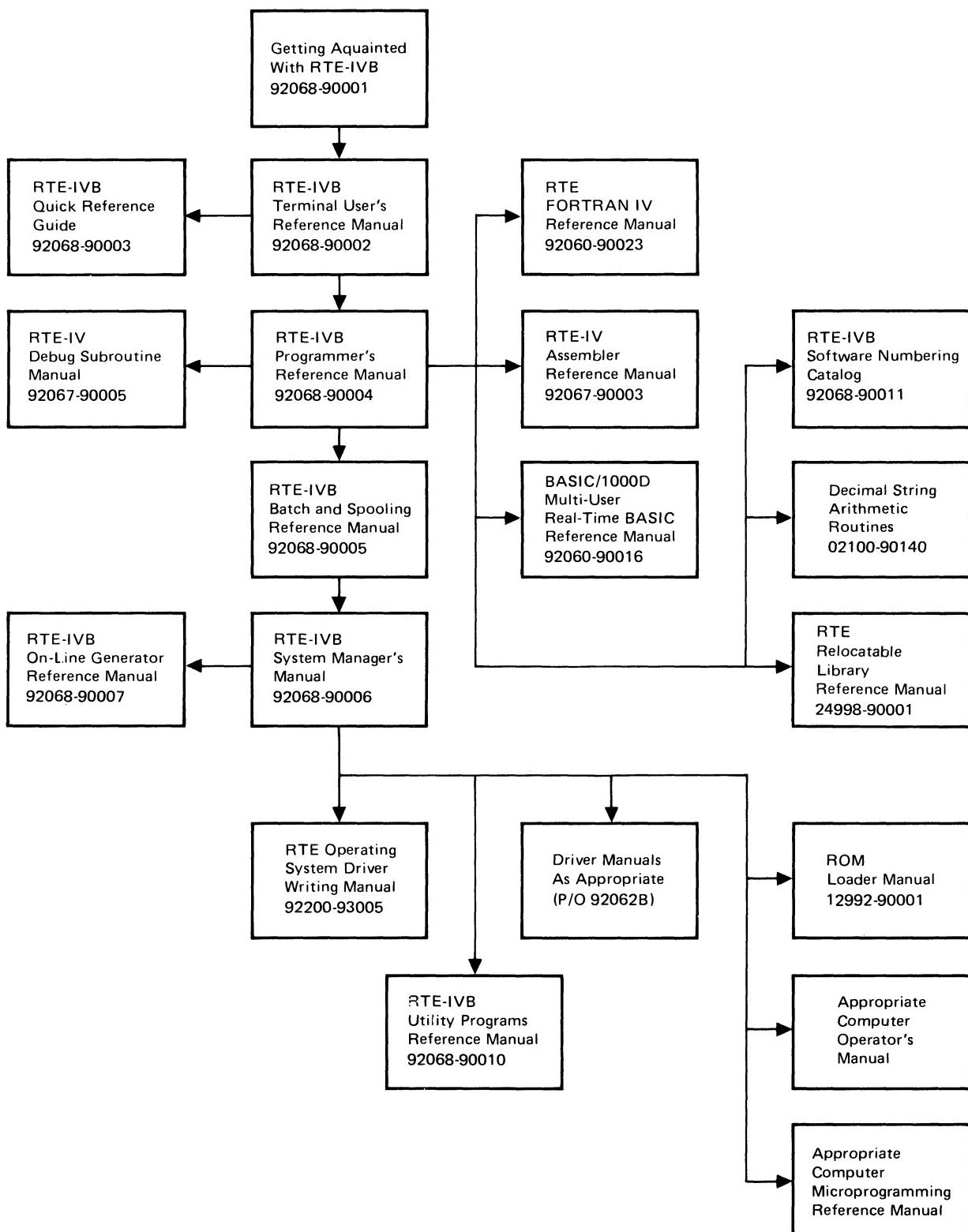
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RTE-IVB DOCUMENTATION MAP



Preface

This manual describes RT4GN, the RTE-IVB On-Line Generator program. The On-Line Generator allows you to generate a new RTE operating system on-line, without shutting down your current RTE operating system. The program executes in the background disc resident program area.

The manual is intended for a system programmer or system manager who has some experience using the HP RTE-IVB operating systems. Before using the On-Line Generator, you should be familiar with the RTE-IVB operating system. The Documentation Map shown on the page following this Preface gives the titles and part numbers of the manuals that provide additional information that will be useful in generating an RTE-IVB system.

The sections within this manual describe the operating specifications for the On-Line Generator, as follows:

- Chapter 1 - An introduction to the On-Line Generator, including a description of the features and the operating environment. Also included are general descriptions of the RTE-IVB operating system and typical system configurations that are used within this manual as a basis for examples and a sample generation.
- Chapter 2 - Describes how to prepare your responses to the generator questions. Worksheets are included on which you may record the responses that are required to generate your operating system. Sample worksheets are provided.

Preface

- Chapter 3 - Describes system generation using the On-Line Generator. Included are instructions on how to schedule the generator for execution, and how to enter your responses. Multiple terminal operation, error handling, number systems, and the generator scratch file are discussed.
- A sample generation based on a typical RTE-IVB system definition is presented.

- Appendix - Eight appendices are included in the manual:
- A. HP Character Set
 - B. RTE-IVB MEMORY ORGANIZATION
 - C. RTE-IVB System Disc Layout
 - D. Generation Worksheet Forms
 - E. Sample Answer File
 - F. Sample Generation Listing
 - G. Error Summary
 - H. RTE-IVB Program Types

Other manuals that offer information relevant to generating and using an RTE-IVB operating system are briefly summarized below:

* RTE-IVB Programmer's Reference Manual

This manual is required for those involved with RTE-IVB system generations. It describes the functions of RTE-IVB and the procedures for utilizing system services by both executing programs and programs being developed. Typical examples of program use of system services are also provided.

* RTE Operating System Driver Writing Manual

This manual provides an overview of the RTE I/O Structure and describes real-time input/output considerations common to site-specific I/O drivers.

* RTE Terminal User's Reference Manual

This manual describes both the Operating System and File Management System commands. RTE Editor (EDITR) commands and the procedures for utilizing all on-line editing services are given (e.g., this manual would be a useful resource in the creating and updating of an answer file that contains correct responses to RT4GN queries).

* Appropriate Driver Manuals

These individual manuals will aid the user in determining the particular drivers necessary for his site-specific combination of devices. The manuals describe the buffering, DCPC, time-outs, and EQT extensions necessary for configuring the various drivers.

* Appropriate Subsystem Manuals and Configuration Guides

These manuals provide the information necessary for configuring any optional subsystems the user may choose to include in his system.

* RTE-IVB System Manager's Manual

This manual guides the RTE System Manager through the overall process of planning, generating, initializing and maintaining his RTE system. It provides procedures for planning your I/O structure, disc structure, and generating specific 92068B software components.

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Chapter 1

Introducing RTE-IVB On-Line System Generation

Using this Manual

The RTE-IVB On-Line Generator Reference Manual provides a set of basic procedures for generating an RTE-IVB system to your specifications. It is suggested that all new users read through this manual before beginning a system generation. The user should become familiar with the terms in the glossary and the information that is contained in the various sections and appendices before attempting to generate a system. Note that sample worksheets are provided throughout the manual. Blank generation worksheets are provided in Appendix D.

The RTE-IVB System Manager's manual should be used in conjunction with this manual as it will lead through the processes required to plan, generate, and initialize your system.

The On-Line Generator Manual discusses generator inputs in general terms only. For specific generator inputs several other RTE-IVB manuals should be readily at hand when filling out the worksheets for your generation: the RTE-IVB System Managers Reference Manual, the various driver manuals, and the appropriate subsystem manuals and configuration guides (see the Preface in this manual for summary descriptions).

Examples are used and referenced throughout the manual to illustrate or clarify information. These examples should be regarded as general information only, since in some cases they may not necessarily reflect the most recent software revisions.

Note that unless otherwise noted in this manual, all references to logical and/or physical memory size are in decimal number of words. Logical memory addresses are in octal.

The RTE On-Line Generator

The RTE-IVB On-Line Generator (RT4GN) is included in the software modules distributed with the HP RTE-IVB Real-Time Executive Operating System.

Introducing RTE-IVB On-Line System Generation

The On-Line Generator program gives you the capability of using your current RTE system to create a different RTE operating system on-line. The On-Line Generator configures an RTE-IVB system based on the information that you enter in response to queries and prompts displayed by the On-Line Generator.

To build the operating system, the On-Line Generator accepts the relocatable programs from disc files. These relocatable programs must exist as File Management Package (FMP) disc files (but cannot be Type 0 files). The On-Line Generator uses these files to build the new system. RT4GN relocates both the required modules and the selected optional software modules and configures the system according to your responses to its queries. The resultant user-defined absolute RTE-IVB system is stored in a Type 1 FMP file created by the generator.

SWTCH, the RTE-IVB system transfer program, is also included in the software modules distributed with RTE-IVB. This utility program transfers the new operating system from the file created by the On-Line Generator to a disc subchannel. You can replace (using SWTCH) the current (or another) operating system with the new operating system by following the detailed procedures described in the System Manager's Manual.

On-Line Generator Features

The On-Line Generator has the following features:

- * The generation process can be directed from an answer file, logical unit, or user console.
- * The TR command can be used at any time to change modes between interactive (operator) and direct (answer file or logical input unit).
- * An HP 7900, 7905, 7906(H), 7920(H) or 7925(H) disc-based system can be generated.
- * Mapping and linkage options may be set for the individual relocation of modules.
- * The generation listed output can be echoed to both the user console and the specified list file.
- * During relocation, the RTE-IVB generator automatically searches all libraries specified during the Program Input Phase. It is not necessary for the user to request library searches for external references.
- * The generator can be aborted by entering the proper request (two exclamation points, "!!") when in either the interactive mode (by you, the operator) or the direct mode (from an answer file).

RTE-IVB Generation Requirements

The following minimum requirements are necessary for generating an RTE-IVB system:

- * RTE-IVB minimum 96K byte system (running on an HP 1000 M, E, or F Series Computer) including:
- * Minimum 14 page (1 page = 2K bytes) partition (includes a 2K byte base page area); however, the larger the partition the faster the generator will proceed.
- * Sufficient FMGR disc tracks to contain the generated system and (optionally) the list file and boot file.
- * Scratch area of six tracks (temporary work area).
- * SWTCH utility program.

NOTE

The page requirements for the On-Line Generator must be increased during relocation to allow for dynamic table space (a minimum 16 page partition is recommended). The generator may be run as a large background (Type 4) program.

Operating System Description

Your RTE-IVB system is structured from a set of software and hardware modules. Beyond minimum requirements (i.e., RTE system modules and drivers), the combination of software and hardware modules is flexible to allow the creation of a system designed specifically to handle your requirements.

RTE-IVB is a multiprogramming system that divides user memory into contiguous blocks of memory called partitions. The maximum physical memory size is 2048K bytes. The physical memory area not occupied or reserved by system requirements and memory resident programs is divided into user partitions. The size and number of these partitions are defined by the user during system generation (the size of the partitions may be modified at system boot-up during reconfiguration).

Up to 64 user partitions can be declared permitting up to 64 disc resident programs to reside in memory at one time.

RTE-IVB allows several programs to be active concurrently, each program executing during the unused central processor time of the others.

Introducing RTE-IVB On-Line System Generation

All input/output and interrupt processing is controlled by RTE-IVB, except for special privileged interrupts that circumvent RTE-IVB for quicker response. When a program requests a non-buffered I/O transfer, RTE-IVB places the program in an I/O suspend state, initiates the I/O operation, and starts executing the next highest priority scheduled program. When the I/O transfer is completed, RTE-IVB reschedules the suspended program for execution. (Buffering allows program swapping while program I/O is being performed.)

User programs can be written in Assembler, or a variety of high level languages.

Programs are scheduled by time intervals, an external event, an operator request, or by another program. (A program may also be scheduled for execution at system bootup.) The RTE-IVB operating system includes software that resolves program competition for CPU time at the same priority.

Physical memory in the RTE-IVB system is divided into areas for the system, memory resident programs, driver partitions, and a series of partitions used for execution of disc resident programs. The basic purpose of the generation is to build various system tables, relocate binary programs specified at generation time, and construct a structured system according to a specific memory configuration. During generation, various program modules are loaded, and generator questions are answered by the user. The memory resident parts of the system (and system tables) are constructed and stored on the disc to be brought into memory during bootup. Drivers are relocated to reside in driver partitions. The remainder of memory is divided into partitions for disc resident programs, and these programs are relocated and saved on the disc to be transferred into memory when needed. The relocatable subroutine library is saved on the disc for use by programs relocated by the RTE On-Line Loader (LOADR) during normal system operation.

NOTE

Be aware that certain software subsystems may have specific requirements when included in the system generation. Options in areas such as spooling, measurements, communications, and multiple terminal operation may place specific requirements on I/O configuration, buffer space, etc. Refer to the RTE-IVB System Managers Manual and the appropriate subsystem and configuration manuals.

The RTE-IVB System to be Generated

A sample system for RTE-IVB will be defined for discussion within subsequent portions of this manual, and the sample system will be used for examples and descriptive material. Your system may differ from the one defined here, but you only need to add or delete the appropriate modules in your generation process.

A sample RTE-IVB system (and the one that is used as an example in this manual) could be comprised of the following modules:

Hardware Modules

HP 2117 Computer
512K Word Main Memory
Memory Protect
TBG (Time Base Generator)
DCPC (Dual Channel Port Controller)
DMS (Dynamic Mapping System)
HP 7925 Disc Subsystem
HP 7906H Disc
HP 2645 System Console
Line Printer

Magnetic Tape Device
HPIB (Hewlett-Packard Interface Bus)
HP 264X Terminals (7 each)

Software Modules

RTE-IVB Memory Resident System
RTE-IVB System Library
Power Fail Driver, DVP43
RTE HELP Utility
RTE-IVB LOADR (Relocating Loader)
RTE Accounts Program
AUTOR (Power Fail/Auto Restart)
RTE-IVB SWITCH Transfer Program
HP 7905/7906/7920/7925 Disc
Driver, DVR32
HP 7906H/7920H/7925H Disc
Driver, DVA32
RTE-IVB WHZAT Inquiry Program
HP LGTAT Utility Program
RTE Compiler Library
RTE Relocatable Library
263X/264X Terminal Driver, DVR05
Line Printer Driver, DVA12
Magnetic Tape Driver, DVR23
HPIB Driver, DVR37
RTE-IVB Spool Program
File Manager Program
File Manager Library
Memory Resident Programs
Disc Resident Programs

Chapter 2

On-Line Generator Program Response Preparation

Planning Introduction

Generation planning involves determining what software resources and services are to be incorporated into your resident operating system and how those resources are to be allocated to maximize their usage. The resources and services desired are specified at generation time in a dialog with the On-Line Generator. You prepare your responses to the generator queries by first filling out the generation worksheets that are provided in this manual.

Some of the data that will be entered in the worksheets is transferred from other documentation (i.e., RTE-IVB System Managers Manual and other relevant subsystem manuals and configuration guides). Other worksheet entries are based on decisions you make after considering your requirements in the context of the optional resources and the memory allocation considerations described in this Chapter.

The generation worksheets that are provided in Appendix D follow the progression of the generation (as described in Chapter 3). When RT4GN is executed, the information that you entered on the worksheets can be easily transferred to the system console (or answer file) in response to the generator's queries.

On the worksheets, user responses and commands are written in capital letters, and generator outputs and queries are printed in boldface type (blanks indicate where user input is expected). Comments to aid the user in filling out the worksheets are included in parentheses.

As you become more familiar with the RTE-IVB system and the on-line generation procedure, you can create an answer file that contains all the parameter input responses derived from the worksheets. A sample answer file for an RTE-IVB generation is included in Appendix E. The generator will read such a file automatically and operate at a much higher speed than if the responses are entered interactively through a user console.

On-Line Generator Dialog

The On-Line Generator dialog is described in this section. The section is organized in parallel with the "phases" executed by the generator during its operation. Some phases do not require user responses but have been listed for completeness. The phases include:

- * Initialization -- The list and output files are established. The destination system disc type and its subchannels are defined. The bootstrap loader is produced (optional). Various system parameters are entered.
- * Program Input -- All relocatable file names are entered, together with information that directs their relocation. The generator uses these entries for later relocation of the file contents.
- * Parameter Input -- The default characteristics of programs that were just entered can be overridden. Entry point values can be modified. Additional system parameters are entered.
- * Table Generation -- Tables describing the I/O configuration are constructed. Table Area I modules are relocated.
- * System Boundaries -- The driver partition size is reported, and you may increment the driver partition page size; driver partition #1 is relocated. The Subsystem Global Area (SSGA) is relocated as the first part of COMMON. COMMON sizes and boundaries are reported, and you may increase the size of these areas.
- * System Loading -- The System Driver Area drivers, Table Area II modules, system executive routines, and user written system routines are relocated to absolute memory addresses. Then the remaining partition resident drivers are relocated.
- * Program Loading -- The Memory Resident Library (MRL) and all memory resident programs are sequentially loaded into the memory resident area. Program relocation continues with real-time disc resident and background disc resident programs.
- * Partition Definition -- This phase begins with a listing of real-time and background program partition size requirements (in pages). This is followed by a report giving the maximum program address spaces for disc resident programs. At this point you may increase the size of System Available Memory. The generator reports the number of pages remaining for partitioning. After this report you define the partitions, and you may modify a program's page requirements. Finally, you may assign specific programs to execute only in specified partitions.

At the end of the generation the On-Line Generator reports that the new system is stored in the type 1 file. The size of the system is reported in decimal number of tracks and sectors and in decimal number of blocks.

Error Reporting

Error conditions encountered during On-Line Generator execution result in the display of numbered error codes. A description of all error codes and appropriate corrective actions are given in Appendix G.

Operator Commands

The following three sections describe the TR, *, !!, and BR commands. The TR, * and !! commands can be entered during the generation process at any point that the generator is waiting for input. The comment command (*) can be used to include comments (partial or complete lines) in the listing and answer file.

TR COMMAND

You may provide responses to the On-Line Generator using two modes of operation -- interactive or direct. The interactive mode is a two-way dialog between you and the generator. The generator displays messages at your console to prompt you for the information it needs to generate an RTE system. You answer the prompts by supplying the required information via your keyboard.

When answers are supplied to the generator from a disc file or a logical input unit, the mode of operation is direct (i.e., from an answer file).

You can alternate between these operating modes at any point that the generator is waiting for input. That is, you may enter the TR command from the user console to transfer to an answer file or logical input unit. Conversely, you may include a TR command within your answer file to transfer to another file or device for input. Transfers can be nested to a level of ten. Any transfer request beyond this limit results in a GEN ERR 19 (see Appendix G). The command format is:

```
TR      ,lu  
       ,filename
```

where:

lu is the logical unit number of an interactive device or of a non-disc device that contains an answer file.

filename is the name of a disc file that contains answers to the generator prompts. The filename format is:

```
filename[:security code[:cartridge label]]
```

Transferring to an illegal logical unit for command input results in a GEN ERR 20 (see Appendix G). The error will be listed on the user console, and a valid LU number can then be entered.

On-Line Generator Program Response Preparation

Once you transfer to a device or file, you may transfer back to the previous device or file by entering a TR with no parameter.

When an end-of-file is encountered in the answer file, an automatic TR to the previous device or file is generated. Similarly, a transfer to the user console occurs when an error is detected. You can then enter the TR command to transfer back to a device or file.

You may include a TR command within your answer file (e.g., in the form TR,1), which results in a transfer of control to the user console (Logical Unit 1). When the TR,lu command is encountered in the answer file, the generator redisplays the current prompt (for the answer it is expecting) on the user console and waits for input from the console. You may enter the appropriate responses, followed by a TR command. This TR command then causes a transfer of control back to the answer file record that follows the original TR,lu command in the answer file. The transfer feature is useful if some answer is not known until a certain point in the generation process is reached.

Alternate versions of the TR command can also be used. For example, each of the following produces an identical result:

```
TR,1  
:1  
,1
```

Below are several examples that illustrate the usage of the TR command:

1. In the following example, generation is partly interactive and partly run from an answer file.

User Input	Current Generator Query	Answer File (ANSFL) Input
-----	-----	-----
<u>:RU,RT4GN</u>	LIST FILE NAMR?	
<u>LIST4::2::100</u>		RTE-IVB GENERATOR MODEL 92068A
		3:30 PM TUE., 10 APR., 1979
<u>YES</u>	ECHO?	
	OUTPUT FILE NAMR?	
<u>TR,ANSFL</u>		RTEIVB::2::3000
	SYSTEM DISC MODEL?	
	CONTROLLER SELECT CODE?	7925

On-Line Generator Program Response Preparation

MODEL,#TRKS,FIRST CYL,HEAD,
 #SURFACES,UNIT,#SPARES
 FOR SUBCHNL:
 00?

TR

00?

7925,244,0,0,9,0,8

.

2. In the following example, part of the initialization phase is run from the answer file.

User Input	Current Generator Query	Answer File (ANSFL) Input
<u>-----</u>	<u>-----</u>	<u>-----</u>
<u>:RU,RT4GN,ANSFL</u>	LIST FILE NAMR?	LISTFL:AB:17::300
	RTE-IVB GENERATOR MODEL 92068A	
	3:30 PM TUE., 10 APR., 1979	
	ECHO?	YES
	OUTPUT FILE NAME?	OUTFL:AB:17::2500
	SYSTEM DISC MODEL?	TR,1
<u>7925</u>	SYSTEM DISC MODEL?	
<u>11</u>	CONTROLLER SELECT CODE?	
	MODEL,#TRKS,FIRST CYL,HEAD, #SURFACES,UNIT,#SPARES FOR SUBCHNL:	
	00?	
<u>7925,256,0,0,9,0,5</u>	01?	
<u>7925,1730,29,0,9,0,52</u>	02?	
<u>7925,2016,227,0,9,0,63</u>	03?	
<u>7925,256,458,0,9,0,8</u>	04?	
<u>7925,2942,485,0,9,0,82</u>	05?	
<u>/E</u>	SYSTEM SUBCHNL?	
<u>TR</u>	AUX DISC?	0
	.	
	.	

*COMMAND

The * command is used to include documentation comments for both answer file preparation and list file reading.

Comment lines must begin with the comment declaration, asterisk (*). When the generator is waiting for input, it simply skips over any comment line and gets the next response line without reissuing the prompt. Note that when the generator encounters an asterisk, the remainder of the line is considered to be a non-executable statement.

NOTE

Any comments entered (via either the user console or an answer file) prior to your response to the LIST FILE NAMR? query will not appear in the list file.

Comments may be included on the same line as a user response by entering an asterisk after the response (the response and the asterisk should be separated by several blanks for clarity in reading).

There are certain restrictions that exist when the response refers to a file name. In this case, asterisks are not allowed within file names, security codes, or cartridge labels. Therefore the following file names would be incomplete because the generator considers the * a comment declaration:

```
OUT*FL:::2::20000 (in this case, OUT would be the file name,  
*FL:::2::2000 would be considered a comment)  
TR,ANSF::*:10  
REL,NCRSYS::*
```

The commands affected by these restrictions are:

```
TR  
RELOCATE
```

Responses affected by these restrictions are:

```
LIST FILE NAMR? response  
OUTPUT FILE NAMR? response  
BOOT FILE NAMR? response
```

!! (Abort) and BR (Break) Commands

The abort command is entered to direct the generator to close all files (see below) and terminate itself. The command format is:

!! (entered in columns 1 and 2)

This command may be entered at any time the generator is waiting for input.

CAUTION

If a name has two exclamation points as its first and second characters (for example, a file named !!ABC) and is to be entered as the first input parameter in response to a generator prompt, you must insert a space in front of the file name. Otherwise the generator will interpret the entry as an abort command.

The generator can also be aborted with the RTE system break (BR) command:

*BR,RT4GN

The generator will then close all files and terminate itself. If you are using a copy of RT4GN, be sure to use the name of that copy when you use this command.

The abort commands cause the absolute output file, the boot file, and the generator scratch file to be purged, but the list file will remain for your examination.

Response Preparation

In the following sections, data output by the generator is shown in bold face type. As you read these sections, you should fill in generation worksheets with your generator inputs. You will need to refer to the RTE-IVB System Manager's Manual and appropriate subsystem manuals and configuration guides for specific responses.

These worksheets are keyed to generation step numbers in the text. Blank generation worksheets are located in Appendix D. Sample filled in worksheets are located at the end of each section.

On-Line Generator Program Response Preparation

NOTE

In the following sections, information not directly used by the generator will be offset from the main texts.

This information will include optional resource usage considerations, general system background information and examples. It is recommended that the new user familiarize himself with this information.

Initialization Phase

During this phase, the On-Line Generator first requests information that is required to create the list and output files and to determine the destination system disc type. The system disc type is the disc model containing LU2 in the generated system. The generator then requests information to set up the track map table that defines disc subchannels. Once the track map table is established, the generator requests additional information that is necessary to begin generation of the system.

Refer to the example given in Figure 2-1 as you follow the steps in the Initialization Phase.

STEP 1 -- LIST FILE NAMR?

Enter either the name of a file, or the logical unit number of a device that will receive the generator listed output. The filename format is:

filename[:security code[:cartridge label [:filesize in blocks]]]

If the filesize is not specified, a default value of 64 blocks will be assumed. (1 block = 128 words)

STEP 2 -- ECHO?

Enter YES to enable a display of all listed output to the user console as well as to the file or device specified in Step 1. If commands are submitted in an answer file, it is especially useful to specify the ECHO option so that the generator's progress can be monitored.

Enter NO to prevent echoing of the listed output.

STEP 3 -- OUTPUT FILE NAMR?

Enter the name of the file to be created for generator output. The system to be generated will reside in this file. The entry format is:

filename[:security code[:cartridge label [:filesize]]]

On-Line Generator Program Response Preparation

Initialization Phase

- ① LIST FILE NAMR?
SYSLI:DB:QQ::450 (generator listed output)
- RTE - IV GENERATOR MODEL 92068A 5:41 PM TUE., 1 MAY., 1979
- ② ECHO?
YES (YES or NO; YES echoes all listed output to user console)
- ③ OUTPUT FILE NAMR?
SESSY:DB:QQ::4000 (contains generated system, must specify file size in blocks)
- ④ SYSTEM DISC MODEL?
7925 (disc model # in destination system)
- ⑤a HP 7900 Disc Only
CONTROLLER SELECT CODE?
_____ (lower # oct. select code for sys. disc controller)
- # TRKS, FIRST TRK ON SUBCHNL?
0?
_____, _____
1?
_____, _____ (terminate your final entry with a /E)
- 2?
_____, _____
- 3?
_____, _____
- 4?
_____, _____
- 5?
_____, _____
- 6?
_____, _____
- 7?
_____, _____

Figure 2-1. Initialization Phase Worksheet Example

On-Line Generator Program Response Preparation

5b HP 7905/7906/7920/7925 Discs Only

CONTROLLER SELECT CODE?
11 (oct. select code for sys. disc controller)

MODEL, # TRKS, FIRST CYL #, HEAD, #SURFACES, UNIT, #SPARES FOR SUBCHNL:

00? 7925, 256, 0, 0, 9, 0, 5 (enter dec.values)

01? 7925, 1500, 29, 0, 9, 0, 66 (terminate your final entry with a /E if <32 subchannels defined)

02? 7925, 193, 203, 0, 9, 0, 5

03? 7925, 193, 225, 0, 9, 0, 5

04? 7925, 193, 247, 0, 9, 0, 5

05? 7925, 193, 269, 0, 9, 0, 5

06? 7925, 193, 291, 0, 9, 0, 5

07? 7925, 193, 313, 0, 9, 0, 5

08? 7925, 193, 335, 0, 9, 0, 5

09? 7925, 193, 357, 0, 9, 0, 5

10? 7925, 193, 379, 0, 9, 0, 5

11? 7925, 193, 401, 0, 9, 0, 5

12? 7925, 256, 423, 0, 9, 0, 5

13? 7925, 193, 452, 0, 9, 0, 5

14? 7925, 193, 474, 0, 9, 0, 5

15? 7925, 193, 496, 0, 9, 0, 5

16? 7925, 193, 518, 0, 9, 0, 5

Figure 2-1. Initialization Phase Worksheet Example (Cont.)

On-Line Generator Program Response Preparation

(5b) HP 7905/7906/7920/7925 Discs Only (Continued)

17?

7925, 193, 540, 0, 9, 0, 5

18?

7925, 193, 562, 0, 9, 0, 5

19?

7925, 193, 584, 0, 9, 0, 5

20?

7925, 193, 606, 0, 9, 0, 5

21?

7925, 193, 628, 0, 9, 0, 5

22?

7925, 193, 650, 0, 9, 0, 5

23?

7925, 193, 672, 0, 9, 0, 5

24?

7925, 96, 694, 0, 9, 0, 3

25?

7925, 150, 705, 0, 9, 0, 3

26?

7925, 96, 722, 0, 9, 0, 3

27?

7925, 96, 733, 0, 9, 0, 3

28?

7925, 194, 744, 0, 9, 0, 4

29?

7925, 194, 766, 0, 9, 0, 4

30?

7925, 194, 788, 0, 9, 0, 4

31?

7925, 114, 810, 0, 9, 0, 3

Figure 2-1. Initialization Phase Worksheet Example (Cont.)

On-Line Generator Program Response Preparation

5c HP 7906H/7920H/7925H/9895 Discs

CONTROLLER SELECT CODE?

12

(oct. select code for sys. disc controller)

MODEL, # TRKS, FIRST CYL #, HEAD, # SURFACES, ADDRESS, # SPARES (, UNIT) FOR SUBCHNL:

00? 7906H, 256, 0, 0, 2, 1, 8, _____
(enter dec.values)

01? 7906H, 203, 132, 0, 2, 1, 5, _____

(terminate your final
entry with a /E if
<32 subchannels defined)

02? 7906H, 203, 236, 0, 2, 1, 5, _____

03? 7906H, 138, 340, 0, 2, 1, 4, _____

04? 7906H, 203, 0, 2, 1, 1, 5, _____

05? 7906H, 198, 208, 2, 1, 1, 5, _____

06? 7906H, 400, 0, 3, 1, 1, 11, _____

07? _____, _____, _____, _____, _____, _____, _____, _____

08? _____, _____, _____, _____, _____, _____, _____, _____

09? _____, _____, _____, _____, _____, _____, _____, _____

10? _____, _____, _____, _____, _____, _____, _____, _____

11? _____, _____, _____, _____, _____, _____, _____, _____

12? _____, _____, _____, _____, _____, _____, _____, _____

13? _____, _____, _____, _____, _____, _____, _____, _____

14? _____, _____, _____, _____, _____, _____, _____, _____

15? _____, _____, _____, _____, _____, _____, _____, _____

16? _____, _____, _____, _____, _____, _____, _____, _____

Figure 2-1. Initialization Phase Worksheet Example (Cont.)

On-Line Generator Program Response Preparation

<p>(6) SYSTEM SUBCHNL? <u>0</u></p> <p>(7) AUX DISC (YES OR NO OR # TRKS)? YES NO # TRKS (decimal) <u>10</u> (oct. select code of Time Base Generator)</p> <p>(8) TBG SELECT CODE? <u>10</u> (oct. select code of Time Base Generator)</p> <p>(9) PRIV. INT. SELECT CODE? <u>0</u> (oct. select code or 0)</p> <p>(10) MEM. RES. ACCESS TABLE AREA II? <u>YES</u> (YES or NO)</p> <p>(11) RT MEMORY LOCK? <u>YES</u> (YES or NO)</p> <p>(12) BG MEMORY LOCK? <u>YES</u> (YES or NO)</p> <p>(13) SWAP DELAY? <u>50</u> (dec. value from 0 to 255 - represents tens of milliseconds)</p> <p>(14) MEM SIZE? <u>512</u> (dec. # of memory pages > 48)</p> <p>(15) BOOT FILE NAMR? <u>0</u> (file or LU # or 0)</p>
--

Figure 2-1. Initialization Phase Worksheet Example (Cont.)

On-Line Generator Program Response Preparation

The generator must create the output file as a Type 1 file, so a file type specified in the fourth NAMR parameter will be ignored. Because Type 1 files cannot be extended, a sufficient number of blocks to contain the generated system must be specified in the file size parameter. If enough blocks are not specified, the generator will be aborted when the output file overflows with a GEN ERR 17.

The generator does a range check to make sure the file size is at least 1000 blocks; if not, a GEN ERR 17 will result. Unused file space will be returned to the system when the generation is completed, so estimate a high value.

A recommended entry for a small system would be 2500. The actual number of blocks used will be reported at the completion of the on-line generation.

STEP 4 -- SYSTEM DISC MODEL?

Enter 7900; Multiple Access Controller (MAC) disc, 7905, 7906, 7920, or 7925; or Integrated Controller Disc (ICD) 7906H, 7920H, or 7925H, depending on the model of disc in the destination system (where the new RTE-IVB system will reside).

STEP 5a -- If the response to SYSTEM DISC was 7900, the following dialog occurs:

CONTROLLER SELECT CODE?

The 7900 controller occupies 2 select codes; enter the lower number (highest priority) octal select code for the system disc controller.

TRKS, FIRST TRK ON SUBCHNL
0?

Enter the decimal number of tracks and the beginning track number (separated by a comma) for subchannel 0. The values are obtained from the HP 7900 Disc Worksheet that was filled out during the planning stage. (Refer to the System Managers Manual).

The generator will continue to display a subchannel number following each entry up to subchannel 7, or until terminated by the entry of the input data terminator, /E.

The even numbered subchannels are the fixed platters, and the odd numbered subchannels are the removable platters (i.e., subchannel 0 is the fixed platter, and subchannel 1 is the removable platter of the first disc drive).

These subchannel inputs enable the generator to build the 7900 track map table, \$TB31. This table is located in System Table Area I and is 2* (#subchannels) words in length.

On-Line Generator Program Response Preparation

STEP 5b -- If the response to SYSTEM DISC was MAC disc 7905, 7906, 7920, or 7925, the following dialog occurs:

CONTROLLER SELECT CODE?

Enter the octal select code for the 13037B/C system disc controller.

MODEL,#TRKS,FIRST CYL,HEAD,#SURFACES,UNIT,#SPARES FOR SUBCHNL:
00?

Enter the disc model number, the decimal number of tracks, starting cylinder number, starting head number, number of surfaces, unit number, and number of spare tracks for subchannel 0 (each value separated by a comma). The values are obtained from the HP 7905, 7906, 7920, or 7925 Disc Worksheet that was filled out during the planning stage.

The generator will continue to display a subchannel number following each entry up to subchannel 31, or until terminated by the entry of the input data terminator, /E.

These subchannel inputs allow the generator to build the 7905/7906/7920/7925 track map table, \$TB32. This table is located in System Table Area I and is $1+5*(\#subchannels)$ words in length.

STEP 5C -- If the response to SYSTEM DISC was 7906H, 7920H, or 7925H, the following dialog occurs:

CONTROLLER SELECT CODE?

Enter the octal select code for the 12821A system disc interface.

MODEL,#TRKS,FIRST CYL,HEAD,#SURFACES,ADDRESS,#SPARES(,UNIT) FOR SUBCHNL:
00?

Enter the disc model number, the decimal number of tracks, starting cylinder number, starting head number, number of surfaces, select address number, number of spare tracks for subchannel 0 (each value separated by a comma), and for 9895 disc only, the unit number. The values are obtained from the HP 7906H, 7920H, 7925H or 9895 Disc Worksheet that was filled out during the planning stage. The 9895 can only be a peripheral disc.

The generator will continue to display a subchannel number following each entry up to subchannel 31, or until terminated by the entry of the input data terminator, /E.

These subchannel inputs allow the generator to build the 7906H/7920H/7925H/9895 track map table, \$TA32. This table is located in System Table Area I and is $1+5*(\#subchannels)$ words in length.

On-Line Generator Program Response Preparation

NOTE

It is possible to have a system with more than one disc controller or interface card. A renamed version of the disc driver must be generated into the system along with its corresponding track map table supplied by the user. Refer to Appendix B of the System Manager's Manual and the RTE-IVB Drivers DVR32/DVA32 Manual for more information.

STEP 6 -- SYSTEM SUBCHNL?

Enter the system disc subchannel number. (Be sure to specify this same subchannel when defining the Logical Unit 2 entry in the Device Reference Table.) This is the subchannel on which the absolute code will reside for execution. The entry can be any one of the subchannels (with <= 256 tracks) that was defined above, except a 9895 subchannel.

STEP 7 -- AUX DISC (YES OR NO OR # OF TRKS)?

Enter YES to indicate that an auxiliary disc is to exist on the same controller select code as the system disc. A YES response causes the generator to request the subchannel number for the auxiliary disc:

AUX DISC SUBCHNL?

Enter the number of the auxiliary disc subchannel (with <= 256 tracks).

Or enter NO to indicate that there is no auxiliary disc.

Or enter a numeric value (decimal) to indicate that an auxiliary disc with a track count of the specified value is to exist on a controller select code other than the system disc controller select code. In this case, the generator will request the model number of the auxiliary disc:

DISC MODEL #?

Enter any valid number for the aux disc subchannel.

An auxiliary disc is not required, but is sometimes useful for:

- * Large file edits
- * More type 6 (SAVE PROGRAM) files - see the RTE-IVB Terminal User's Reference Manual
- * More general file space
- * Decreasing swapping time, since system tracks are allocated from the top of the available track list

On-Line Generator Program Response Preparation

downward (i.e., from the last available track towards the first available track in contiguous chunks). This feature permits the auxiliary disc to be used as a "swapping disc". Because LU3 can be on another disc or a controller of a different type, head movement is reduced, thus optimizing a system for speed.

STEP 8 -- TBG SELECT CODE?

Enter the octal select code of the Time Base Generator card. Note that there will be no driver, logical unit number, or EQT number associated with the TBG card.

STEP 9 -- PRIV. INT. SELECT CODE?

Enter the octal select code of the Privileged Interrupt card. Enter a zero if there is no such card on the system. Note that there will be no driver, logical unit number, or EQT number associated with the Privileged Interrupt card. For more information regarding privileged interrupts, see the section on privileged interrupt processing in the RTE Operating System Driver Writing Manual.

STEP 10 -- MEM. RES. ACCESS TABLE AREA II?

Enter YES if Table Area II and the System Driver Area are to be included in the user map for access by memory resident programs.

Enter NO to deny memory resident programs access to Table Area II in the memory resident program map.

The answer to this question will affect the way the System builds the logical map of the memory resident area. Figure 2-2 shows the memory resident maps in either case. Note that a NO response to this question will leave more space in the memory resident map. This additional space can be used to make programs memory resident that will not fit otherwise. However, a YES response is required if memory resident programs:

- Perform EXEC I/O calls to drivers located in the System Driver Area that do not do their own mapping. (These drivers will have the S parameter specified in the equipment table definition of their devices.) Refer to Appendix B for a discussion of the System Driver Area.
- Access modules in System Table Area II. Table Area II contains the system tables, ID segments, some system entry points, and all type 13 modules. Refer to Appendix B for a description of this area.

On-Line Generator Program Response Preparation

- Normally default to Type 2 or 3 (Real Time or Background disc resident) programs. Since programs which must run as Type 2 or 3 access Table Area II or SDA, they must have access to these areas if generated as a memory resident (Type 1). Many HP support modules that are defaulted to Type 2 or 3 programs (e.g., SPOUT) have this requirement.

If you are unsure as to the requirements of your memory resident modules, it is suggested that you respond YES to the above question. Refer to Appendix B for a more detailed discussion of the Memory Resident map.

STEP 11 -- RT MEMORY LOCK?

Enter YES to permit any real-time program to lock itself into its partition (disallows swapping of that program if it requests a memory lock).

Enter NO to deny real-time memory locking.

STEP 12 -- BG MEMORY LOCK?

Enter YES to permit any background program to lock itself into its partition (disallows swapping of that program). Note that the SWTCH program requires the BG memory lock capability.

Enter NO to deny background memory locking.

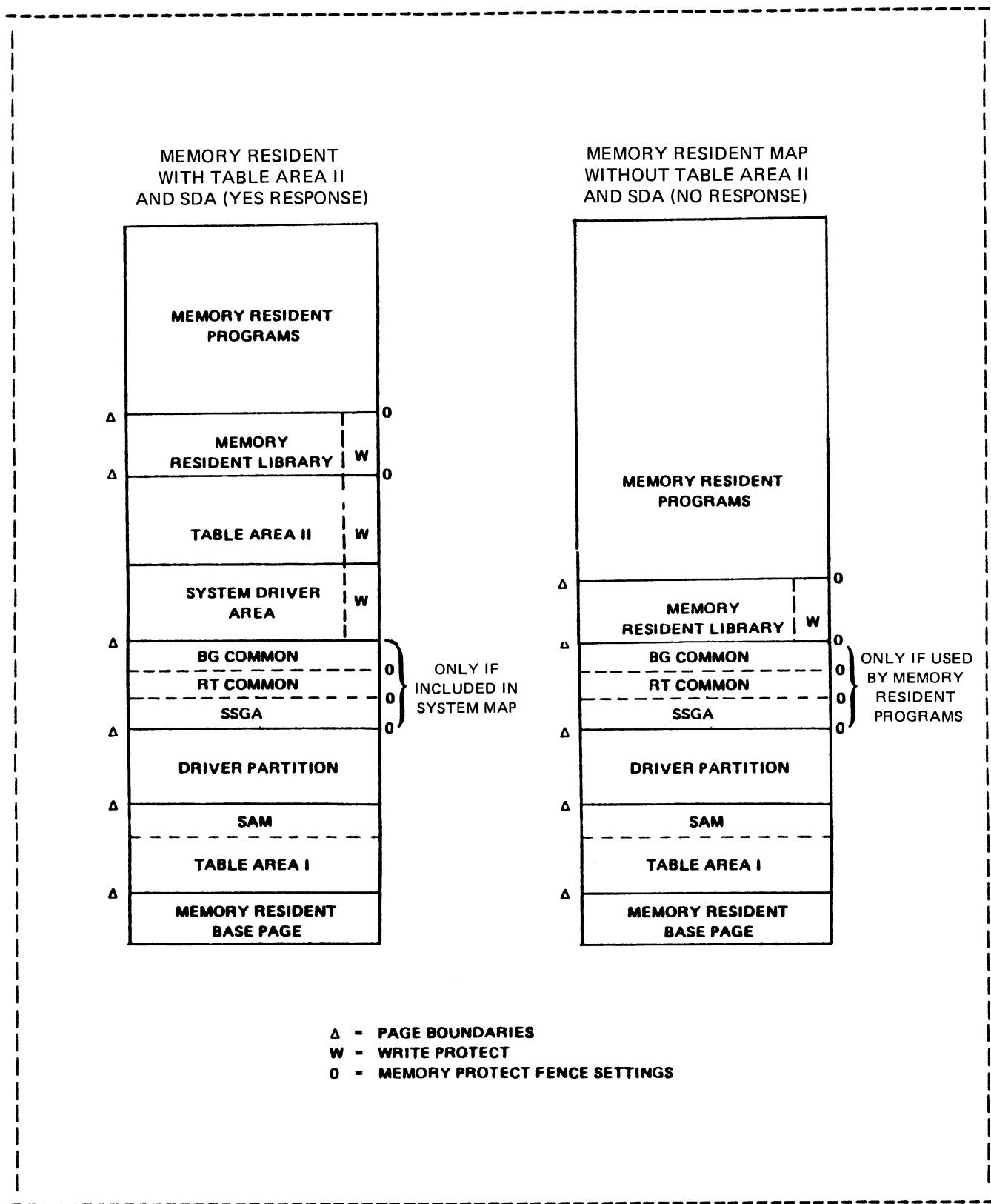


Figure 2-2. Memory Resident Maps

On-Line Generator Program Response Preparation

STEP 13 -- SWAP DELAY?

Enter a decimal value in the range of 0 through 255. This value represents tens of milliseconds. The swap delay value specified is applicable to all swappable programs.

"Swapping" is necessary in a multiprogrammed environment where programs must compete with each other for system resources (CPU time, partition space, buffer memory, disc space, etc.). If a program cannot have a resource (for whatever reason), it is suspended until that resource is available; if that program is disc resident, then its partition may be used by another program. If so, then the first program's memory partition is copied to a disc track ("rolled out") where it is saved in its uncompleted and modified state, and the other program is brought in from the disc. During a swap, a check is made to see if work can be done by another program already residing in main memory. I/O operations continue concurrently.

Since a "swap" can take as much as half a second, during which time that partition is idle, and since the DCPC cycles slow down the CPU (because swaps use direct memory access), it is important to minimize needless swapping.

The "swap delay" parameter is one way to control swapping. It is only useful when you have programs that run on a time-scheduled basis, or that schedule themselves with offset, waiting for something. If the current partition resident program is waiting for a particular time of day, if it has a higher priority than other programs that are waiting to execute in that partition, and if the time remaining is less than or equal to the current swap delay, then the current resident remains in the partition (it is not swapped out), and that partition stays unchanged until the time arrives for its resident program to run.

You should adjust the swap delay so that it is longer than the maximum time taken to swap a program out and roll another one in. If it is too short, then the system will waste time swapping the current program out. If it is too long, then the partition will stand "idle" longer than necessary.

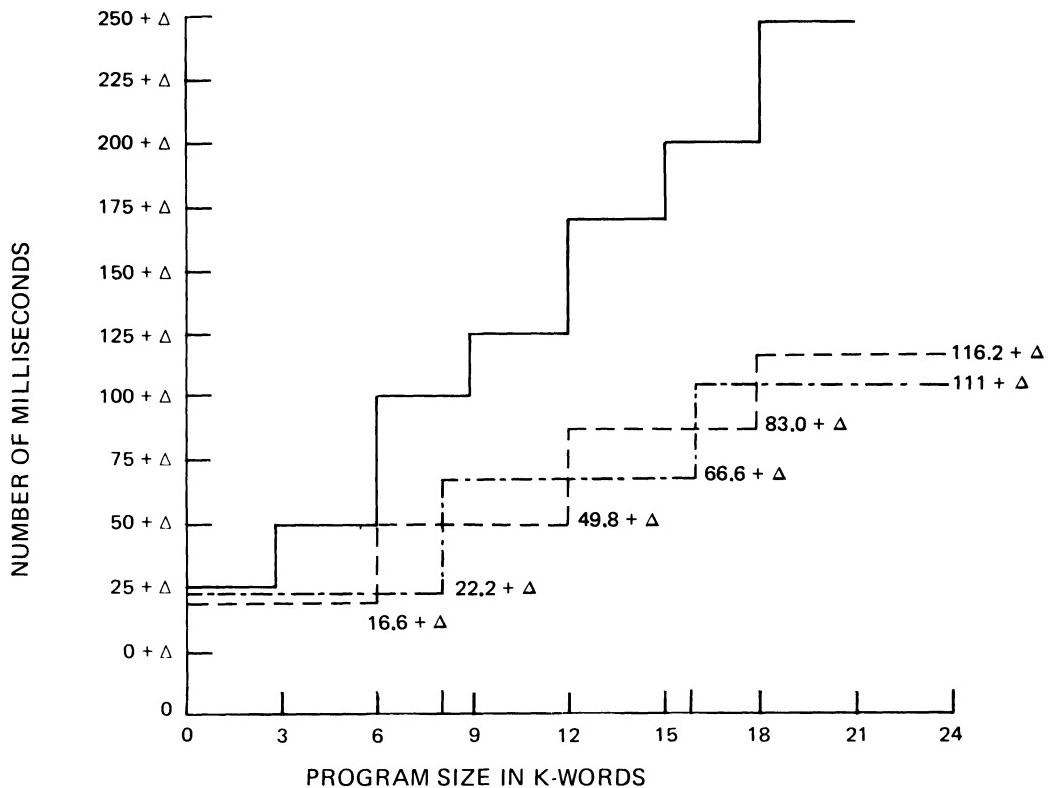
On-Line Generator Program Response Preparation

The amount of time required for a program to swap depends on several factors: type of disc drive, program length, whether or not the program is segmented, and whether or not the program uses EMA. For the HP 7900 disc drive, the transfer time is 25 milliseconds for each 3K words. For the HP 7905, 7906(H) or 7920(H) disc drive, the transfer time is 16.7 milliseconds for each 6K words. For the 7925(H) disc drive, it is 22.2 milliseconds for 8K words. To calculate swap delay value tailored to memory size, program size, and disc type, refer to Figure 2-3. Note that the graph in this figure takes track switching into account.

For example, if the value 100 is entered here, a program will not be swapped if it:

1. Resides in a disc resident area
2. Is in the time list
3. Has priority over its competitor for that memory area
4. Is to run within 1000 milliseconds (one second) of the current time.

On-Line Generator Program Response Preparation



THIS GRAPH REPRESENTS THE TIME IT TAKES TO READ OR WRITE
A PROGRAM (INCLUDING BASE PAGE) TO THE DISC. THE TIMES
SHOULD BE DOUBLED TO GET THE TOTAL SWAP TIME.

NOTES:

Δ = AVERAGE ACCESS TIME, WHICH IS COMPOSED OF THE TWO QUANTITIES:

A.

THE ROTATIONAL DELAY. THIS DELAY RANGES FROM 0 TO ONE ROTATION TIME (RT) WITH EQUAL PROBABILITY. THUS THE AVERAGE ROTATIONAL DELAY IS RT/2.

B.

THE SEEK TIME (ST) FOR MOVING HEAD DISCS RANGES FROM 0 TO SOME MAXIMUM WITH A NON-EQUAL PROBABILITY. THE SEEK TIME DEPENDS ON THE LAST ACCESSED TRACK NUMBER.

— HP 7900

—·— HP 7925(H)

- - - HP 7905/7906(H)/7920(H)

Figure 2-3. Swap Delay Graph

On-Line Generator Program Response Preparation

EXAMPLE:

USING THE ABOVE PRINCIPLES AND GIVEN THE FOLLOWING DATA FOR VARIOUS DISCS, WE CAN PLOT THE LOAD/SWAP TIME AS A FUNCTION OF THE NUMBER OF WORDS. NOTE THAT THE NUMBER OF WORDS IS AFFECTED BY THE "ALL OF MEMORY BIT".

FOR AN HP 7900:

RT = 25 MS
RT'S/TRACK = 2
WORDS/RT = 3K
AVERAGE SEEK TIME = 35 MS
AVERAGE ACCESS TIME = 47.5 MS

FOR AN HP 7905/7906(H)/7920(H):

RT = 16.66 MS
RT'S/TRACK = 1
WORDS/RT = 6K
AVERAGE SEEK TIME = 25 MS
AVERAGE ACCESS TIME = 33.3 MS

FOR AN HP 7925(H):

RT = 22.2 MS
RT'S/TRACK = 1
WORDS/RT = 8K
AVERAGE SEEK TIME = 27 MS
AVERAGE ACCESS TIME = 38.1 MS

WHERE:

RT = ROTATION TIME

RT'S/TRACK = # OF ROTATIONS REQUIRED TO EXAMINE DATA FROM AN ENTIRE TRACK

WORDS/RT = # OF WORDS PASSING UNDER A HEAD DURING ONE ROTATION

THE SWAP DELAY TIME FOR A 7900 DISC INCLUDES:

1. TIME REQUIRED TO SWITCH HEADS AFTER 3K WORDS OF A TRACK ARE EXAMINED.
2. ROTATION TIME PLUS TIME REQUIRED TO SWITCH HEADS AFTER AN ENTIRE TRACK (6K WORDS) HAS BEEN EXAMINED.
3. RANDOM ACCESS TIME, WHICH IS AVERAGE SEEK TIME PLUS AVERAGE ROTATIONAL DELAY.

THE SWAP DELAY TIME FOR A 7905/7906(H)/7920(H)/7925(H) DISC INCLUDES:

1. ROTATION TIME AFTER 6K OR 8K WORDS (ONE TRACK) ARE EXAMINED.
2. RANDOM ACCESS TIME, WHICH IS AVERAGE SEEK TIME PLUS AVERAGE ROTATIONAL DELAY.

Figure 2-3. Swap Delay Graph (Cont.)

On-Line Generator Program Response Preparation

STEP 14 -- MEM SIZE?

Enter a decimal value (minimum 48) indicating the total number of memory pages (1 page = 1K words = 2K bytes) in your system; that is, 48 for 48K, 64 for 64K, 128 for 128K, etc. (maximum 1024K).

STEP 15 -- BOOT FILE NAMR?

Enter the name of a file to be created by the generator, or the logical unit number of a device that will output the bootstrap loader that is produced by the generator. The file name entry format is:

filename[:security code[:cartridge label]]

Enter a zero if no bootstrap loader is to be produced.

RTE is bootstrapped into memory by a program located on the first two sectors (for 7900/7905/7920/7925 discs) or the first four sectors (for 7906H/7920H/7925H discs) of the System Subchannel (LU2) called the boot extension. The boot extension is responsible for reading a portion of the operating system into memory and starting up the system. There are two ways of loading the boot extension into memory. First, the boot file produced by the generator can be used to activate it. This requires that the boot file be read into memory (via minicartridge, magnetic tape, or paper tape) every time the system is bootstrapped.

The second method of bootstrapping this system uses the disc loader ROM. The ROM is activated via the front panel switches (or the optional RPL feature at power up). If the ROM is used, the generator boot file is not required. The ROM requires the boot extension to be located in specific regions of the disc (disc unit 0, head 0,1,2, or 3, cylinder 0; for RPL-head 0 or 2 only). It therefore restricts the location of the system subchannel. This should be taken into account during the disc planning process. Refer to the RTE-IVB System Manager's Manual for details on disc planning and ROM usage.

Program Input Phase

STEP 16 -- PROG INPUT PHASE:

The generator displays this message to announce the beginning of the Program Input Phase. During this phase commands are entered that direct the entry of modules into the system. (Refer to the example given in Figure 2-4 as you follow the steps in this phase.)

On-Line Generator Program Response Preparation

The commands entered in this phase control mapping reports, linkage, symbol table listings, and inform the generator which program files to relocate. Note, however, that the actual relocation is not done during this phase.

Terminate the Program Input Phase by entering the input data terminator, /E.

Program Input Phase Commands

Step 16a -- MAP Command

You use the MAP command to obtain memory mapping information during the relocation process. Maps describing module names and/or entry points, and their boundary addresses may be displayed. Base page linkage information can also be included in the displayed map. The command format is (note that multiple options must be separated by commas):

	MODULES
	GLOBALS
MAP	LINKS
	OFF
	ALL

where:

MODULES	requests a map of the relocated modules by name
GLOBALS	requests a map of each relocated module's entry points
LINKS	requests a map that reports base page linkage addresses
OFF	disables mapping (turns all mapping display options off)
ALL	requests a report of modules, globals, and links.

If the MAP command is omitted, MAP OFF is assumed by the On-Line Generator.

On-Line Generator Program Response Preparation

PROG INPUT PHASE:

(output by generator at start of Program Input Phase)

-

(generator prompt issued throughout Program and Parameter
Input Phases)

- 16a Enter mapping options using the MAP command. This command may be reentered at any time during this phase to change mapping options.

$$\left(\text{MAP } \left\{ \begin{array}{l} \text{MODULES} \\ \text{GLOBALS} \\ \text{LINKS} \\ \text{OFF} \\ \text{ALL} \end{array} \right. ; \text{ may have combinations,} \right. \\ \text{separated by commas} \left. \right)$$

MAP ALL [.....
optional]

-

- 16b Enter linkage control options using the LINKS IN command. The LINKS IN command may be reentered at any time during this phase to change linkage options.

$$\left(\text{LINKS IN } \left\{ \begin{array}{l} \text{BASE} \\ \text{CURRENT} \end{array} \right. \right)$$

LINKS IN CURRENT

(specify BASE or CURRENT)

-

Figure 2-4. Sample Program Input Phase Worksheet

On-Line Generator Program Response Preparation

(16c) Enter the RELOCATE commands (with optional MAP, LINKS IN, and DISPLAY commands)

REL ,%CR451::SM _____ (REL [(name)] ,filename [: ac [: cartridge label]])

REL ,%CR452::SM _____ (RT4GN responds with a — after each user input)

REL ,%\$CNFX::SM _____

REL ,%WHZAT::SM _____

REL ,%AUTR::SM _____

REL ,%DVR32::SM _____

REL ,%DVA32::SM _____

REL ,%STA32::SM _____

REL ,%DVR23::SM _____

REL ,%DVA05::SM _____

REL ,%2DV37::SM _____

REL ,%SRQP::SM _____

REL ,%DVA12::SM _____

REL ,%CLIB::SM _____

REL ,%FF4.N::SM _____

REL ,\$MLIB1::SM _____

REL ,\$MLIB2::SM _____

REL ,\$MLIB3::SM _____

Figure 2-4. Sample Program Input Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

16c REL ,%DBUGR::SM _____ (REL [(name)],filename [: sc [: cartridge label]])
REL ,%DKULB::SM _____ (RT4GN responds with a — after each user input)
*ICD/MAC Disc Back Up Library
REL ,%DSCLB::SM _____ *ICD/MAC Disc Utility Library
REL ,%DBKLB::SM _____ *7900 Disc Back Up Utility Library
REL ,%DECAR::SM _____
REL ,%HPIB::SM _____
REL ,%UTLIB::SM _____
REL ,%BAMLIB::SM _____
REL ,%BASLB::SM _____
REL ,%VLIB::SM _____
REL ,%BMPG1::SM _____
REL ,%BMPG2::SM _____
REL ,%BMPG3::SM _____
REL ,%SMON1::SM _____
REL ,%SMON2::SM _____
REL ,%SPO1B::SM _____
REL ,%SPO2B::SM _____
REL ,%4LDR::SM _____
REL ,%EDITR::SM _____

Figure 2-4. Sample Program Input Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

(16c) REL, %LGTAT::SM _____ (REL [(name)],filename [: sc [: cartridge label]])

REL, %LSAVE::SM _____ (RT4GN responds with a - after each user input)

REL, %USAVER::SM _____

REL, %RESTR::SM _____

REL, %VERIFY::SM _____

REL, %COPY ::SM _____

REL, %COMPL::SM _____

REL, %CLOAD::SM _____

REL, %READT::SM _____

REL, %WRITT ::SM _____

REL, %HELP ::SM _____

REL, %ACCTS ::SM _____

REL, %FORMAT ::SM _____

REL, %4SYLB::SM _____

REL, \$FNDLB::SM _____

LE _____

Figure 2-4. Sample Program Input Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

- (16d) Enter DISPLAY command options to obtain symbol table information, if necessary.

(DISPLAY {TABLE
UNDEFS [,TR]
symbol name})

DISPLAY UNDEFS [,
optional TR] (enter either TABLE, UNDEFS, or symbol name; UNDEFS optionally followed by a TR.)

- (16e) Enter /E to terminate this phase.

Figure 2-4. Sample Program Input Phase Worksheet (Cont.)

If you enter the MAP command, you must specify at least one of the mapping options. You may specify any combination of options, in any order, separated by commas. (The options specified will be processed from left to right.) For example:

```
MAP MODULES,LINKS
MAP OFF
MAP LINKS,GLOBALS
MAP OFF,MODULES  (disables all options, reenables modules option)
MAP ALL
```

Once invoked, the MAP option remains in effect for all relocatable modules declared in subsequent RELOCATE commands or until it is disabled (MAP OFF). This command may be reentered at any time during the Program Input Phase to change options as desired.

Because the MAP command may be entered at any time during the Program Input Phase to change mapping options, a module appended to another module during relocation may have different mapping options. Generally it is wise to use the MAP ALL option so that this information (which later could be helpful in solving generation problems) will appear in the generation listing.

Step 16b -- LINKS IN Command

You use this command to inform the generator whether linkages are to be via the base page only or via current page and base page. If the LINKS IN CURRENT command is not entered, the generator assumes only base page linkage is to be used. The command format is:

```
LINKS IN      BASE  
              CURRENT
```

Once invoked, the LINKS IN command remains in effect for modules specified through subsequent RELOCATE commands. The LINKS IN command may be reentered at any time during the Program Input Phase to change the linkage mode.

Due to the addressing architecture of the HP 1000 Computers, instructions may only directly access data located in the current instruction page or in the program's base page (page 0). To access areas outside these two regions, programs must make use of locations in the current page or base page containing the address of the desired data. These locations are called links. Programs make indirect references through links to access data or instructions outside their directly addressable area. The generator will automatically create links in two circumstances:

- References to external entry points. The generator will automatically create a link for each external entry point referenced in a program (unless it is a DEF to an external with an initial offset, in which case it is direct). These links are always located in the base page.
- References to data/instructions located outside the current page. Since the relocation of programs in memory depends on many factors (e.g., program type, size, common, etc.) it would be very difficult for a program to make provisions for linking and still make efficient use of memory. Therefore, the generator does this automatically by allocating a link whenever an instruction makes a direct reference outside the current page.

In all cases where links are generated, the referencing instruction is modified to make an indirect reference through the link. Since references to external entry points always use base page links, the LINKS IN command effects the second type of reference described above. An example of base page linking (LINKS IN BASE) is shown in Figure 2-5. In this example, two instructions reference areas outside their pages. When the generator detects this condition, it will allocate base page links and modify

the instructions to use the links.

An example of current page linking (LINKS IN CURRENT) is shown in Figure 2-6. Here links are allocated in the same page as the reference instruction. Current page links are allocated in two areas: immediately preceding the program and immediately following the program.

The LINKS IN CURRENT command is used to reduce the number of base page links and consequently to conserve available words on the base page. Links are put in current page only on the first and last pages of a module. Program page crossings may cause indirect links to be generated on the base page if there are no current page link areas in the same page as the reference instruction.

The LINKS IN CURRENT command will probably be the option used most frequently. The LINKS IN BASE command is generally used only when memory space is critical, or when you need to reduce program size by a minimal number of words; (e.g., if a program is slightly too large for the partition in which you want it to run).

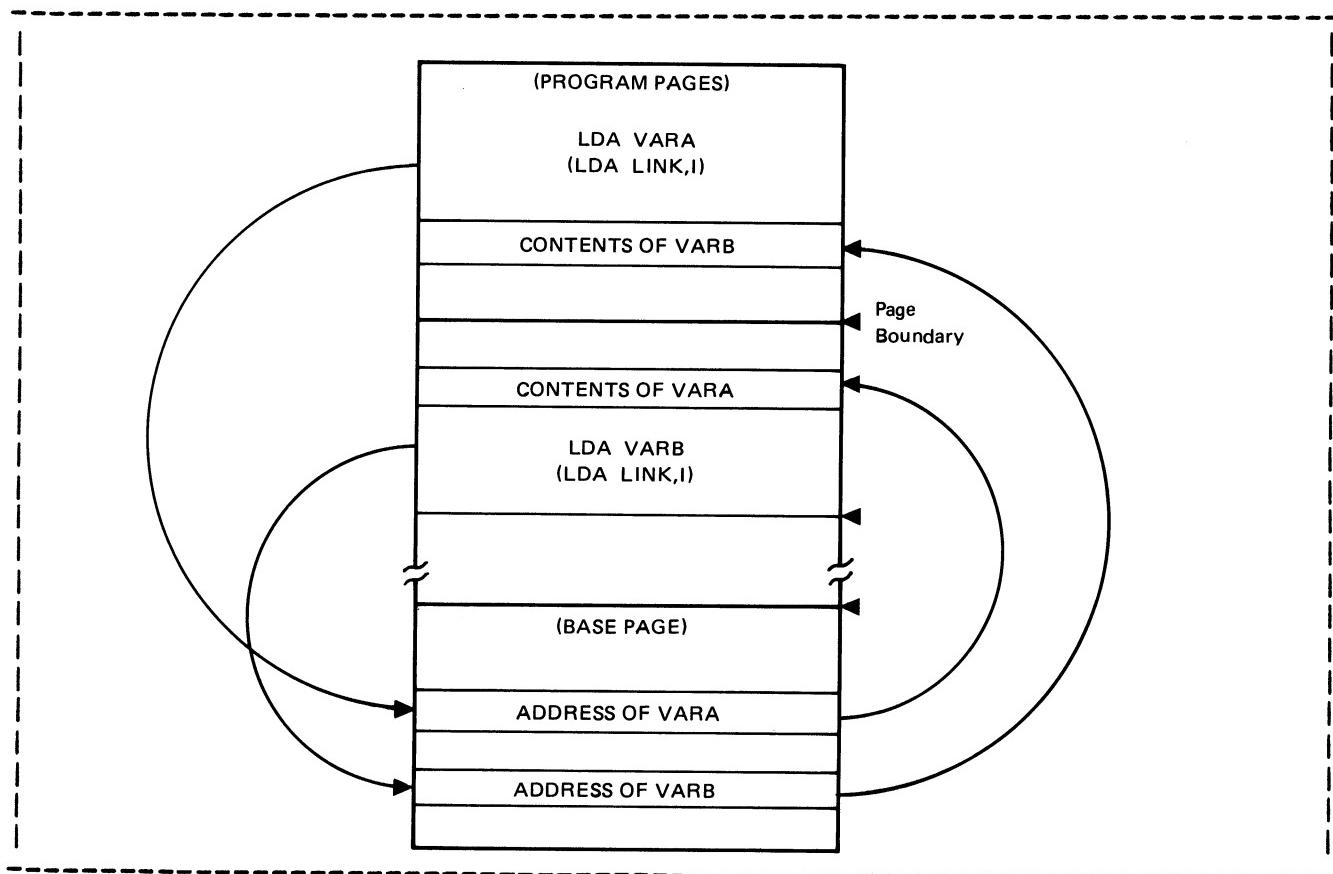


Figure 2-5. Base Page Linking

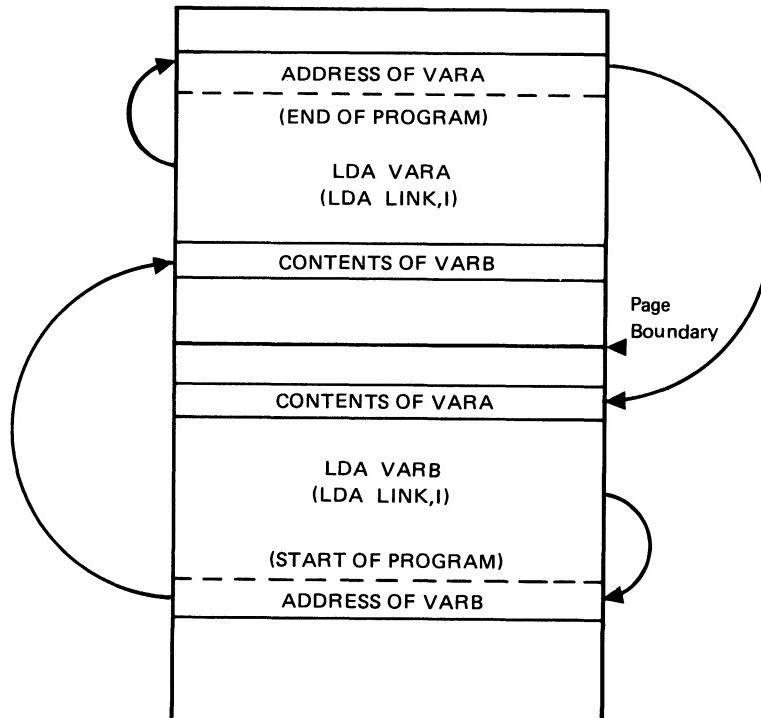


Figure 2-6. Current Page Linking

Step 16c -- RELOCATE Command

Enter the RELOCATE command to specify which modules are to be included in the generation. The command format is (note that a comma must always precede the filename):

`RELOCATE [(name)],filename`

or,

`REL [(name)],filename`

where:

(name) is the program name of a specific module to be relocated. The name must be enclosed in parentheses. This is an optional parameter; if it is omitted, the entire contents of the file are relocated.

On-Line Generator Program Response Preparation

filename is the name of the file that contains the module or modules to be relocated. The filename entry format is:

```
filename[:security code[:cartridge label]]
```

The RELOCATE command directs the generator to read and unconditionally relocate program modules (during the Program Loading Phase).

If name is omitted, all modules in the file specified by filename are relocated.

If name is specified, all other modules in the named file are ignored; i.e., preceding modules in the file are skipped, and the file scan terminates following relocation of the named module.

When you use the RELOCATE command, the specification of a main program module must precede that of the program's segments.

The order that modules are specified during the relocation phase can effect the order that modules are relocated in the system. You can arrange the order of modules to perform the following optimizations:

- Reduce Memory Resident Links. Memory resident programs are relocated by the generator in the same order that their relocatable modules are specified to the generator. By reordering these modules, it may be possible to have fewer programs cross page boundaries and thereby reduce the number of links created. This will be most useful in situations where memory resident program space is very limited or the total memory resident program area just slightly exceeds a page boundary (thereby wasting most of the last page).
- Reduce the number of driver partitions. The generator attempts to optimize the relocation of drivers into driver partitions. After the first driver is relocated into a partition, a scan is made down the list of remaining unrelocated drivers for a driver that will fit into the remainder of the partition. This process is repeated until a driver small enough to fit into the remaining driver partition space can not be found. When this occurs, the generator will allocate a new partition to contain the remaining drivers.

When searching for a driver to fill a driver partition, the generator takes the first driver in the list that will fit. This may not be the best fit. You can control the order that drivers are searched by ordering them the intended way during the relocation phase. Basically, you want to order your drivers such that by grouping them to fill

On-Line Generator Program Response Preparation

driver partitions, you get the fewest number of groups.

- Reduce library search time. The order that library routines are specified during the relocation phase will effect their position in the disc resident library. To reduce library search time for on-line loads, frequently accessed library modules should be placed as close to the start of the disc resident library as possible. Since modules in the relocatable library are normally accessed more often than those in the system library. It is suggested that the former be specified first during the relocation phase.

Step 16d -- DISPLAY Command

You can invoke the DISPLAY command to list, on the user's console and the list file, the contents of the symbol table, the names of undefined external symbols, or the presence of a specific symbol. The DISPLAY command format is:

```
TABLE  
DISPLAY UNDEFS[,TR]  
symbol name
```

where:

TABLE	requests a list of the entry points contained in the symbol table.
UNDEFS[,TR]	requests a list of any undefined symbols (unresolved external references). TR is an optional parameter (only used with the UNDEFS option) that allows a transfer to the user console if any undefined symbols exist; otherwise, the generator proceeds.
symbol name	requests the generator to search the symbol table for a specific symbol. "UNDEFINED" is printed if the symbol is not found.

If you enter a DISPLAY UNDEFS,TR command before exiting from the Program Input Phase, you will have the opportunity to satisfy, through modules specified in additional RELOCATE commands, any undefined externals that may exist.

On-Line Generator Program Response Preparation

NOTE

The generator automatically lists all undefined symbols (in the list file only) after exiting from the Program Input Phase. These symbols remain undefined unless changed during the CHANGE ENT'S phase. During program relocation, all instructions referencing undefined symbols will be replaced with a NOP (no operation).

If you generate %BASLB into your system but are not using the HP6940 Multiprogrammer Subsystem, then the symbol &6940 will be listed as undefined here. This is not an error and therefore no action is required to correct it.

Parameter Input Phase

STEP 17 -- PARAMETERS

This message announces the beginning of the Parameter Input Phase.

During this phase you can modify the type, priority, and execution interval, or the ENT (entry) record of any of the programs specified during the Program Input Phase. The original type, priority, and execution interval of each program was specified at the beginning of its source code. (Refer to the example given in Figure 2-7 as you follow the steps in this phase.) Refer to Appendix B for a discussion of the RTE-IVB memory configuration and the various components that comprise the system.

Enter the parameter string in the following general form:

```
name,[type[,priority[,execution interval]]]
```

where:

name is the name of the program.

type 0 -- system program or driver.

1 -- memory resident.

2 -- real-time disc resident.

3 -- background disc resident.

4 -- background disc resident without Table Area II access.

5 -- program segment (RT or BG).

6 -- library, reentrant or privileged subroutines (note that if called by a memory resident program, these routines are relocated into the Memory Resident Library. Aside from memory resident loading they are treated as Type 7.).

7 -- library, utility subroutines (appended to calling program and stored in the relocatable library of the disc).

On-Line Generator Program Response Preparation

8 -- if program is a main, it is deleted from the system,
or,

if program is a subroutine, it is used to satisfy
any external references during generation; however,
it is not stored in the relocatable library area of
the disc.

13 -- (Table Area II) system entry points that contain
pointers and system values that are defined at
generation. Table Area II is a combination of these
relocated Type 13 modules and system tables that are
built by the generator.

14 -- same as Type 6, but automatically included in the
Memory Resident Library. Aside from memory resident
loading, they are treated as Type 7.

15 -- (Table Area I) system entry points that must be
included in the system and user maps. Table Area I
is a combination of these relocated Type 15 modules
and I/O tables that are built by the generator.

30 -- Subsystem Global Area (SSGA).

NOTE

In some cases the primary type code (i.e., 1, 2, 3, 4)
may be expanded by adding 8, 16, 24, or 128 to the
number. These expanded types allow such features as:
access to real-time COMMON by background programs,
access to SSGA, and a do not duplicate indicator. See
Table 2-1 for a summary of program types.

The primary type code of a main program and its
segments must not be changed because the relationship
between the program and its segments would be lost.

priority is the program priority in the range of 1 through
32767 (1 is the highest priority).

On-Line Generator Program Response Preparation

Figure 2-7. Sample Parameter Input Phase Worksheet

On-Line Generator Program Response Preparation

(18) CHANGE ENTS?

(change/create entry points?)

TAN , RP , 105320

(generator prompt)

SQRT , RP , 105321

(entry, type - AB or RP, value)

ALOG , RP , 105322

ATAN , RP , 105323

COS , RP , 105324

SIN , RP , 105325

EXP , RP , 105326

ALOGT , RP , 105327

TANH , RP , 105330

TRNL , RP , 105331

CMRT , RP , 105332

ATLG , RP , 105333

FPWR , RP , 105334

TPWR , RP , 105335

DAD , RP , 105014

DSB , RP , 105034

DMP , RP , 105054

DDI , RP , 105074

DSBR , RP , 105014

Figure 2-7. Sample Parameter Input Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

(18) <u>.DDIR</u> , <u>RP</u> , <u>105134</u>	(change/create entry points?)
<u>-</u>	
<u>.DNG</u> , <u>RP</u> , <u>105203</u>	(generator prompt)
<u>-</u>	
<u>.DIN</u> , <u>RP</u> , <u>105210</u>	(entry, type - AB or RP, value)
<u>-</u>	
<u>.DDE</u> , <u>RP</u> , <u>105211</u>	
<u>-</u>	
<u>.DIS</u> , <u>RP</u> , <u>105212</u>	
<u>-</u>	
<u>.DDS</u> , <u>RP</u> , <u>105213</u>	
<u>-</u>	
<u>.DCO</u> , <u>RP</u> , <u>105204</u>	
<u>-</u>	
<u>DBLE</u> , <u>RP</u> , <u>105201</u>	
<u>-</u>	
<u>SNGL</u> , <u>RP</u> , <u>105202</u>	
<u>-</u>	
<u>.DFER</u> , <u>RP</u> , <u>105205</u>	
<u>-</u>	
<u>.XPAK</u> , <u>RP</u> , <u>105206</u>	
<u>-</u>	
<u>.BLE</u> , <u>RP</u> , <u>105207</u>	
<u>-</u>	
<u>.NGL</u> , <u>RP</u> , <u>105214</u>	
<u>-</u>	
<u>.XCOM</u> , <u>RP</u> , <u>105216</u>	
<u>-</u>	
<u>.DCM</u> , <u>RP</u> , <u>105216</u>	
<u>-</u>	
<u>DDINT</u> , <u>RP</u> , <u>105217</u>	
<u>-</u>	
<u>.XFER</u> , <u>RP</u> , <u>105220</u>	
<u>-</u>	
<u>.GOTO</u> , <u>RP</u> , <u>105221</u>	
<u>-</u>	
<u>.MAP</u> , <u>RP</u> , <u>105222</u>	
<u>-</u>	
<u>.ENTR</u> , <u>RP</u> , <u>105223</u>	

Figure 2-7. Sample Parameter Input Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

(18) .ENTP , RP , 105224 (change/create entry points?)
—
.PWR2 , RP , 105225 (generator prompt)
—
.FLUN , RP , 105226 (entry, type - AB or RP, value)
—
\$.SETP , RP , 105227
—
.PACK , RP , 105230
—
.CFER , RP , 105231
—
..FCM , RP , 105232
—
..ICM , RP , 105233
—
.LBT , RP , 105763
—
.SBT , RP , 105764
—
.DLD , RP , 104200
—
.DST , RP , 104400
—
.MPY , RP , 100200
—
.DIV , RP , 100400
—
CLRIO , RP , 2001
—
.FAD , RP , 105000
—
.FSB , RP , 105020
—
.FMP , RP , 105040
—
.FDV , RP , 105060
—
IFIX , RP , 105100

Figure 2-7. Sample Parameter Input Phase Worksheet (Cont.).

On-Line Generator Program Response Preparation

(18)	<u>.FIXD , RP , 105104</u>	(change/create entry points?)
-	<u>FLOAT , RP , 105120</u>	(generator prompt)
-	<u>.FLTD , RP , 105124</u>	(entry, type - AB or RP, value)
-	<u>.XADD , RP , 105001</u>	(terminate your final entry with a /E)
-	<u>.XSUB , RP , 105021</u>	
-	<u>.XMPY , RP , 105041</u>	
-	<u>.XDIV , RP , 105061</u>	
-	<u>.XFXS , RP , 105101</u>	
-	<u>.DINT , RP , 105101</u>	
-	<u>.XFXD , RP , 105105</u>	
-	<u>.XFTS , RP , 105121</u>	
-	<u>.IDBL , RP , 105121</u>	
-	<u>.XFTD , RP , 105125</u>	
-	<u>.TADD , RP , 105002</u>	
-	<u>.TSUB , RP , 105022</u>	
-	<u>.TMPY , RP , 105042</u>	
-	<u>.TDIV , RP , 105062</u>	
-	<u>.TFXS , RP , 105102</u>	
-	<u>.TINT , RP , 105102</u>	
-	<u>.TFXD , RP , 105106</u>	

Figure 2-7. Sample Parameter Input Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

(18) .TFTS , RP , 105122 (change/create entry points?)
—
.ITBL , RP , 105122 (generator prompt)
—
.TFTD , RP , 105126 (entry, type - AB or RP, value)
—
.EMAP , RP , 105257
—
.EMIO , RP , 105240
—
MMAP , RP , 105241
—
.MVW , RP , 105777
—
.CMW , RP , 105776
—
Z\$DBL , RP , 4
—
.VECT , RP , 101460
—
VPIV , RP , 101461
—
VABS , RP , 101462
—
VSUM , RP , 101463
—
VNRM , RP , 101464
—
VDOT , RP , 101465
—
VMAX , RP , 101466
—
VMAB , RP , 101467
—
VMIN , RP , 101470
—
VMIB , RP , 101471
—
VMOV , RP , 101472

Figure 2-7. Sample Parameter Input Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

(18)

VSWP , RP , 101473 (change/create entry points?)
—
.ERES , RP , 101474 (generator prompt)
—
.ESEG , RP , 101475 (entry, type - AB or RP, value)
—
.VSET , RP , 101476
—
.DVCT , RP , 105460
—
DVPIV , RP , 105461
—
DVABS , RP , 105462
—
DVSUM , RP , 105463
—
DVNRM , RP , 105464
—
DVDOT , RP , 105465
—
DVMAX , RP , 105466
—
DVMAB , RP , 105467
—
DVMIN , RP , 105470
—
DVMIB , RP , 105471
—
DVMOV , RP , 105472
—
DVSWP , RP , 105473
—
/E , _____ , _____
—
_____ , _____ , _____
—
_____ , _____ , _____
—
_____ , _____ , _____

Figure 2-7. Sample Parameter Input Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

execution interval is a list of six parameters specifying the times the program should be scheduled for execution once it is turned on. The first two values (decimal) specify the execution interval, and the last four (decimal) specify an initial absolute starting time. The parameters are:

[res[,mult[,hour,min,sec,10msec]]]

res resolution code (0 to 4):

0 -- no execution interval
1 -- tens of milliseconds
2 -- seconds
3 -- minutes
4 -- hours

mult execution interval multiple (0 to 4095);
an integer that specifies the time interval between program runs. 0 indicates that the program is to run once.

Initial Absolute Starting Time (four values):

hour, hours (0 to 23)
min, minutes (0 to 59)
sec, seconds (0 to 59)
10msec tens of milliseconds (0 to 99).

The generator has an additional feature that applies to memory and disc resident programs. During the Parameter Input Phase, one program can be scheduled to execute automatically whenever the RTE system is booted up from the system disc. This is accomplished by adding the value 80 to the program's type code. For example, if PROG is originally a Type 2 program (real-time disc resident), it can be changed to:

PROG,82

This entry will cause PROG to be automatically scheduled each time the system is booted up from the disc and after the File Manager has been scheduled. If more than one program is assigned for automatic scheduling, only the last one entered will be recognized.

It is also possible to disable the File Manager's automatic program renaming feature. (See the RTE-IVB Programmer's Reference Manual for a discussion of program renaming under the File Manager). If the value 128 is added to PROG's type code, PROG will never be renamed when executed. (No duplication). Thus PROG will never be renamed to PROXX (where XX is the terminal's system lu) when run. Terminate the parameter entry list using the input data terminator, /E.

On-Line Generator Program Response Preparation

Table 2-1. Summary of RTE-IVB Program Types

PROGRAM CATEGORY	PROGRAM TYPE	COMMON ACCESS					LOAD POINT	MEMORY PROTECT FENCE
		REAL-TIME COMMON	BACKGROUND COMMON	SSGA	RT COMMON & SSGA	BG COMMON & SSGA		
EXECUTABLE PROGRAMS	1	✓					L ₁	F ₅
	9		✓				L ₁	F ₅
MEMORY RESIDENT*	17			✓			L ₁	F ₁
	17				✓		L ₁	F ₁
	25					✓	L ₁	F ₁
REAL TIME DISC RESIDENT*††	2	✓					L ₄	F ₆
	10		✓				L ₄	F ₆
	18			✓			L ₄	F ₁
	18				✓		L ₄	F ₁
	26					✓	L ₄	F ₁
BACKGROUND DISC RESIDENT*††	3		✓				L ₄	F ₆
	11	✓					L ₄	F ₆
	19			✓			L ₄	F ₁
	19				✓		L ₄	F ₁
	27				✓		L ₄	F ₁
BACKGROUND DISC RESIDENT WITHOUT TABLE AREA II ACCESS*††	4		✓				L ₃	F ₂
	12	✓					L ₃	F ₂
	20			✓			L ₂	F ₁
	20				✓		L ₂	F ₁
	28				✓		L ₂	F ₁

*ADD 80 TO ANY OF THESE TYPES TO SPECIFY
AUTOMATIC SCHEDULING AT SYSTEM STARTUP.

†† ADD 128 TO ANY OF THESE TYPES TO SPECIFY THAT THE PROGRAM CANNOT BE DUPLICATED.

On-Line Generator Program Response Preparation

Table 2-1. Summary of RTE-IVB Program Types (Cont.)

SPECIAL PROGRAMS	TYPE	DESCRIPTION
SYSTEM MODULE	0	MODULE TO BE LOADED WITH RESIDENT SYSTEM. PART OF HP-SUPPLIED SYSTEM, USER-WRITTEN DRIVER, ETC.
PROGRAM SEGMENT	5	OVERLAYABLE MODULE USED WITH DISC RESIDENT MAIN. COMMON TYPE, MEMORY-PROTECT FENCE ADDR. AND LOAD PT. DETERMINED BY MAIN.
SUBROUTINE	6	RELOCATED INTO RESIDENT LIBRARY IF CALLED BY ANY MEMORY RESIDENT PROGRAM (ALWAYS BECOME 7'S).
SUBROUTINE	7	STORED ON DISC IN RELOCATABLE FORM. ANY PROGRAM CALLING A TYPE 7 HAS A COPY APPENDED TO IT.
SUBROUTINE	8	APPENDED TO CALLING PROGRAM. ALL TYPE 8 RELOCATABLES ARE DISCARDED AFTER GENERATION.
TABLE AREA II	13	MODULE TO BE LOADED WITH RESIDENT SYSTEM IN TABLE AREA II. PART OF HP-SUPPLIED SYSTEM, USER-WRITTEN TABLES, ETC.
SUBROUTINE	14	RELOCATED INTO RESIDENT LIBRARY, WHETHER CALLED OR NOT (ALWAYS BECOME TYPE 7).
TABLE AREA I	15	MODULE TO BE LOADED WITH RESIDENT SYSTEM IN TABLE AREA I. PART OF HP-SUPPLIED SYSTEM, USER-WRITTEN TABLES, ETC.
SSGA MODULE	30	RELOCATED INTO SUBSYSTEM GLOBAL AREA OF SYSTEM. ACCESSIBLE ONLY TO PROGRAMS OF PROPER TYPE (ABOVE).

LOAD POINT & FENCE DEFINITIONS (SEE FIGURES 2-12 AND B-2)

L ₁ — NEXT AVAILABLE LOCATION DURING LOAD OF RESIDENTS PLUS 2	F ₁ — FIRST WORD OF SSGA
L ₂ — 35TH WORD OF NEXT PAGE AFTER COMMON AREAS	F ₂ — FIRST WORD OF PAGE FOLLOWING DRIVER PARTITION
L ₃ — 35TH WORD OF NEXT PAGE AFTER DRIVER PARTITION	F ₃ — FIRST WORD OF RT COMMON
L ₄ — 35TH WORD OF NEXT PAGE AFTER TABLE AREA II	F ₄ — FIRST WORD OF BG COMMON
	F ₅ — FIRST WORD OF RESIDENT PROGRAM AREA
	F ₆ — FIRST WORD OF PAGE FOLLOWING TABLE AREA II

On-Line Generator Program Response Preparation

STEP 18 -- CHANGE ENTS?

When the generator outputs this query, you can enter your changes to the ENT records. Type 3 (absolute) and Type 4 (replace) ENT records can be created and/or modified. Enter your changes in the following form:

entry,type,value

where:

entry is the entry point name

type is the entry point type; AB = absolute, RP = replace

value is the entry point instruction value. Octal numbers are assumed unless the letter "D" (denotes decimal) follows the number.

When an entry point is redefined to the absolute (AB) type, the address of that entry point will be replaced by the absolute value declared. All instructions that reference this entry point will use the new absolute address specified.

For example:

UDEV1,AB,30

Will declare entry point UDEV1 absolute with a value of 30 octal. This implies that the instruction OTA UDEV1 will be replaced with OTA 30.

When an entry point is redefined to the replace type = RP, the loader will replace each reference to it with the number declared in the value parameter. You can then create Type 4 entry records that are microcode replacement values. Then, a JSB instruction referencing an external entry point is intercepted by the RTE Loader and RT4GN and changed to a value that has been defined by the RP command. This allows the elimination of software subroutines by replacing subroutine entry points with microcode instructions.

For example:

.FMP,RP,105040

causes each JSB .FMP instruction (floating point multiply) to be changed to the microcode floating point multiply instruction (105040).

On-Line Generator Program Response Preparation

The value of an EMA common block entry point cannot be modified.

The microcode replacement values to be generated into the system will depend on your hardware configuration. Refer to the RTE-IVB System Manager's Manual and other appropriate manuals for information regarding optional HP microcode routines and RP values.

Table Generation Phase

Required system tables, including the Equipment Table (EQT), the Device Reference Table (DRT), and the Interrupt Table (INT) are built during the Table Generation Phase. Relocation begins with the Table Area I modules. (Refer to the example given in Figure 2-8 as you follow the steps in this phase.)

STEP 19 -- TABLE AREA I <<PAGE XXXXX>>:
EQUIPMENT TABLE ENTRY

These messages, along with a report of the starting physical page number, begin the Table Generation Phase. They are followed by a prompt that requests input for the first EQT entry:

EQT 01?

Respond with EQT entry number one in the form:

select code,driver[,B][,D][,S][,M][,T=ttttt][,X=xxx]
where:

select code is the octal select code number (I/O slot)

driver is the driver name and number in the form DVynn;
e.g., DVR32

B may be specified to enable automatic output buffering for output requests

D may be specified to request direct memory access (DCPC channel required by driver)

S may be specified to force driver into the System Driver Area

M may be specified to force driver into the System Driver Area and declare that it is to do its own mapping

T=tttt may be specified to declare a time-out interval for device interrupt (tttt represents tens of milliseconds in the range of 1-32767)

X=xxx may be specified to declare an extended EQT entry (xxx represents the number of words to extend the entry in the range of 1-999).

(Refer to the individual driver manuals for more information regarding buffering, time-out, etc.)

On-Line Generator Program Response Preparation

TABLE AREA I <<PAGE XXXXX>> :

(output by generator
at start of Table
Generation Phase)

19) EQUIPMENT TABLE ENTRY

EOT 01?

11 , DVR32 , D , _____, _____, _____, _____, _____, _____

(oct. select code,
driver [,B] [,D]
[,S] [,M] [,T = tttt]
[,X = xxx])

EOT 02?

12 , DVA32 , D , T=100 , _____, _____, _____, _____, _____

(do not specify SDA
for system disc
driver)

EOT 03?

13 , DVA05 , B , X=13 , T=12000 , _____, _____, _____, _____

(terminate your
final entry with a /E)

EOT 04?

14 , DVA12 , B , T=300 , _____, _____, _____, _____, _____

EOT 05?

15 , DVR37 , B , X=50 , T=20000 , _____, _____, _____, _____

EOT 06?

16 , DVR23 , B , D , _____, _____, _____, _____, _____

EOT 07?

20 , DVA05 , B , X=13 , T=12000 , _____, _____, _____, _____

EOT 08?

21 , DVA05 , B , X=13 , T=12000 , _____, _____, _____, _____

EOT 09?

22 , DVA05 , B , X=13 , T=12000 , _____, _____, _____, _____

EOT 10?

23 , DVA05 , B , X=13 , T=12000 , _____, _____, _____, _____

EOT 11?

24 , DVA05 , B , X=13 , T=12000 , _____, _____, _____, _____

EOT 12?

25 , DVA05 , B , X=13 , T=12000 , _____, _____, _____, _____

EOT 13?

26 , DVA05 , B , X=13 , T=12000 , _____, _____, _____, _____

EOT 14?

70 , DVS43 , M , X=18 , _____, _____, _____, _____, _____

EOT 15?

71 , DVS43 , M , X=18 , _____, _____, _____, _____, _____

EOT 16?

72 , DVS43 , M , X=18 , _____, _____, _____, _____, _____

EOT 17?

73 , DVS43 , M , X=18 , _____, _____, _____, _____, _____

EOT 18?

74 , DVS43 , M , X=18 , _____, _____, _____, _____, _____

EOT 19?

75 , DVS43 , M , X=18 , _____, _____, _____, _____, _____

Figure 2-8. Sample Table Generation Phase Worksheet

On-Line Generator Program Response Preparation

(19)

Equipment Table Entry (Continued)

EQT 20?

76, DVS43, M, X=18, _____, _____, _____, _____

EQT 21?

77, DVS43, M, X=18, _____, _____, _____, _____

EQT 22?

4, DVP43, M, _____, _____, _____, _____, _____

EQT 23?

/E, _____, _____, _____, _____, _____, _____, _____

EQT 24?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 25?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 26?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 27?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 28?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 29?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 30?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 31?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 32?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 33?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 34?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 35?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 36?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 37?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 38?

_____, _____, _____, _____, _____, _____, _____, _____

EQT 39?

_____, _____, _____, _____, _____, _____, _____, _____

Figure 2-8. Sample Table Generation Phase Worksheet (Cont.).

On-Line Generator Program Response Preparation

(20)

DEVICE REFERENCE TABLE

(system console)	001 = EQT #?	(LU1 = EQT #?)
	<u>3</u> ,	
(system disc)	002 = EQT #?	(eqt entry, optional subchannel; the subchannel # should match the response in Step (6))
	<u>1</u> ,	
(auxiliary disc)	003 = EQT #?	(terminate your final entry with a /E)
	<u>1</u> , <u>14</u>	
(standard output)	004 = EQT #?	(number should match response to Step (7a), if entered)
	<u>3</u> , <u>1</u>	
(standard input)	005 = EQT #?	
	<u>3</u> , <u>2</u>	
(standard list)	006 = EQT #?	
	<u>4</u> ,	
	007 = EQT #?	
	<u>5</u> ,	
(mag. tape)	008 = EQT #?	
	<u>6</u> ,	
	009 = EQT #?	
	<u>1</u> , <u>1</u>	
	010 = EQT #?	
	<u>1</u> , <u>2</u>	
	011 = EQT #?	
	<u>1</u> , <u>3</u>	
	012 = EQT #?	
	<u>1</u> , <u>4</u>	
	013 = EQT #?	
	<u>1</u> , <u>5</u>	
	014 = EQT #?	
	<u>1</u> , <u>6</u>	
	015 = EQT #?	
	<u>1</u> , <u>7</u>	
	016 = EQT #?	
	<u>1</u> , <u>8</u>	
	017 = EQT #?	
	<u>1</u> , <u>9</u>	
	018 = EQT #?	
	<u>1</u> , <u>10</u>	
	019 = EQT #?	
	<u>1</u> , <u>11</u>	
	020 = EQT #?	
	<u>1</u> , <u>12</u>	

Figure 2-8. Sample Table Generation Phase Worksheet (Cont.).

On-Line Generator Program Response Preparation

(20)

Device Reference Table (Continued)

021 = EQT #?	041 = EQT #?	061 = EQT #?
<u>1</u> , <u>13</u>	<u>2</u> , <u>3</u>	<u>2</u> , <u>23</u>
022 = EQT #?	042 = EQT #?	062 = EQT #?
<u>1</u> , <u>15</u>	<u>2</u> , <u>4</u>	<u>2</u> , <u>24</u>
023 = EQT #?	043 = EQT #?	063 = EQT #?
<u>1</u> , <u>16</u>	<u>2</u> , <u>5</u>	<u>2</u> , <u>25</u>
024 = EQT #?	044 = EQT #?	064 = EQT #?
<u>1</u> , <u>17</u>	<u>2</u> , <u>6</u>	<u>2</u> , <u>26</u>
025 = EQT #?	045 = EQT #?	065 = EQT #?
<u>1</u> , <u>18</u>	<u>2</u> , <u>7</u>	<u>2</u> , <u>27</u>
026 = EQT #?	046 = EQT #?	066 = EQT #?
<u>1</u> , <u>19</u>	<u>2</u> , <u>8</u>	<u>2</u> , <u>28</u>
027 = EQT #?	047 = EQT #?	067 = EQT #?
<u>1</u> , <u>20</u>	<u>2</u> , <u>9</u>	<u>2</u> , <u>29</u>
028 = EQT #?	048 = EQT #?	068 = EQT #?
<u>1</u> , <u>21</u>	<u>2</u> , <u>10</u>	<u>2</u> , <u>30</u>
029 = EQT #?	049 = EQT #?	069 = EQT #?
<u>1</u> , <u>22</u>	<u>2</u> , <u>11</u>	<u>2</u> , <u>31</u>
030 = EQT #?	050 = EQT #?	070 = EQT #?
<u>1</u> , <u>23</u>	<u>2</u> , <u>12</u>	<u>22</u> ,
031 = EQT #?	051 = EQT #?	071 = EQT #?
<u>1</u> , <u>24</u>	<u>2</u> , <u>13</u>	<u>7</u> ,
032 = EQT #?	052 = EQT #?	072 = EQT #?
<u>1</u> , <u>25</u>	<u>2</u> , <u>14</u>	<u>8</u> ,
033 = EQT #?	053 = EQT #?	073 = EQT #?
<u>1</u> , <u>26</u>	<u>2</u> , <u>15</u>	<u>9</u> ,
034 = EQT #?	054 = EQT #?	074 = EQT #?
<u>1</u> , <u>27</u>	<u>2</u> , <u>16</u>	<u>10</u> ,
035 = EQT #?	055 = EQT #?	075 = EQT #?
<u>1</u> , <u>28</u>	<u>2</u> , <u>17</u>	<u>11</u> ,
036 = EQT #?	056 = EQT #?	076 = EQT #?
<u>1</u> , <u>29</u>	<u>2</u> , <u>18</u>	<u>12</u> ,
037 = EQT #?	057 = EQT #?	077 = EQT #?
<u>1</u> , <u>30</u>	<u>2</u> , <u>19</u>	<u>13</u> ,
038 = EQT #?	058 = EQT #?	078 = EQT #?
<u>1</u> , <u>31</u>	<u>2</u> , <u>20</u>	<u>7</u> , <u>1</u>
039 = EQT #?	059 = EQT #?	079 = EQT #?
<u>2</u> , <u>1</u>	<u>2</u> , <u>21</u>	<u>7</u> , <u>2</u>
040 = EQT #?	060 = EQT #?	080 = EQT #?
<u>2</u> , <u>2</u>	<u>2</u> , <u>22</u>	<u>7</u> , <u>4</u>

Figure 2-8. Sample Table Generation Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

(20)

Device Reference Table (Continued)

081 = EQT # ?
8, 1

082 = EQT # ?
8, 2

083 = EQT # ?
8, 4

084 = EQT # ?
9, 1

085 = EQT # ?
9, 2

086 = EQT # ?
9, 4

087 = EQT # ?
10, 1

088 = EQT # ?
10, 2

089 = EQT # ?
10, 4

090 = EQT # ?
11, 1

091 = EQT # ?
11, 2

092 = EQT # ?
11, 3

093 = EQT # ?
11, 4

094 = EQT # ?
12, 1

095 = EQT # ?
12, 2

096 = EQT # ?
12, 3

097 = EQT # ?
12, 4

098 = EQT # ?
13, 1

099 = EQT # ?
13, 2

100 = EQT # ?
13, 3

101 = EQT # ?
13, 4

102 = EQT # ?
14, _____

103 = EQT # ?
15, _____

104 = EQT # ?
16, _____

105 = EQT # ?
17, _____

106 = EQT # ?
18, _____

107 = EQT # ?
19, _____

108 = EQT # ?
20, _____

109 = EQT # ?
21, _____

110 = EQT # ?
1E, _____

111 = EQT # ?
_____ , _____

112 = EQT # ?
_____ , _____

113 = EQT # ?
_____ , _____

114 = EQT # ?
_____ , _____

115 = EQT # ?
_____ , _____

116 = EQT # ?
_____ , _____

117 = EQT # ?
_____ , _____

118 = EQT # ?
_____ , _____

119 = EQT # ?
_____ , _____

120 = EQT # ?
_____ , _____

121 = EQT # ?
_____ , _____

122 = EQT # ?
_____ , _____

123 = EQT # ?
_____ , _____

124 = EQT # ?
_____ , _____

125 = EQT # ?
_____ , _____

126 = EQT # ?
_____ , _____

127 = EQT # ?
_____ , _____

128 = EQT # ?
_____ , _____

129 = EQT # ?
_____ , _____

130 = EQT # ?
_____ , _____

131 = EQT # ?
_____ , _____

132 = EQT # ?
_____ , _____

133 = EQT # ?
_____ , _____

134 = EQT # ?
_____ , _____

135 = EQT # ?
_____ , _____

136 = EQT # ?
_____ , _____

137 = EQT # ?
_____ , _____

138 = EQT # ?
_____ , _____

139 = EQT # ?
_____ , _____

140 = EQT # ?
_____ , _____

Figure 2-8. Sample Table Generation Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

(21) INTERRUPT TABLE

(enter octal select codes in ascending order)

(generator prompt)

(select code, option, destination)

-4, ENT, \$POWR

(terminate your final entry with a /E)

-11, EQT, 1

-12, EQT, 2

-13, PRG, PRMPT

-14, EQT, 4

-15, EQT, 5

-16, EQT, 6

-17, EQT, 6

-20, PRG, PRMPT

-21, PRG, PRMPT

-22, PRG, PRMPT

-23, PRG, PRMPT

-24, PRG, PRMPT

-25, PRG, PRMPT

-26, PRG, PRMPT

-70, EQT, 13

-71, EQT, 14

-72, EQT, 15

-73, EQT, 16

Figure 2-8. Sample Table Generation Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

(21)

Interrupt Table (Continued)

(enter octal select codes in ascending order)

(generator prompt)

(select code, option, destination)

74, EQT, 17

(terminate your final entry with a /E)

75, EQT, 18

76, EQT, 19

77, EQT, 20

/E, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

—, _____, _____

Figure 2-8. Sample Table Generation Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

EQT entry 01 should be for the system disc. A typical EQT entry for the HP 7925 disc is:

11,DVR32,D

Once you respond to the request for EQT entry 01, the prompt is incremented by one and repeated:

EQT 02?

Each time you respond, the prompt is incremented by one and redisplayed. A maximum of 63 EQT entries may be defined.

Terminate the EQT Table Entry using the input data terminator, /E.

Each EQT entry on the worksheet contains a blank for the driver name which contains five characters, starts with the characters "DV" and ends with a two-digit octal number (i.e., DVynn).

The remaining blanks on the EQT entry line are for D (DCPC required), B (buffered output), S (System Driver Area), M (System Driver Area with mapping), T (time-out), and X (extended EQT). The blanks are filled in as shown in the example in Figure 2-9. EQT parameter specifications are dependent upon driver and device requirements. With the possible exception of the B and T parameters, EQT specifications should be taken directly from the appropriate driver manuals, subsystem configuration guides, and the System Manager's Manual.

If B is specified, automatic output buffering will be enabled for the device. The operating system will copy into a system buffer data that is to be output to a device. This will allow program processing to proceed currently with output requests (rather than suspending the program while it waits for a buffer in the program to be emptied).

If D is specified for a device, then the system will allocate a DCPC channel for the device whenever an I/O request is made to the device.

If S is specified, then the associated driver will be relocated into the System Driver Area. If M is specified, then the associated driver will be relocated into the System Driver Area, and the driver will do its own mapping. For drivers declared in more than one EQT, the S and/or M options must be identical. All drivers with neither S nor M specified will be relocated into the Driver Partition Area. Drivers without EQT'S will be relocated with the Type 0 system modules. Do not specify M or S for the disc driver.

NOTE

Unbuffered drivers not doing their own mapping should not be forced into the System Driver Area if they are to be used by Type 4 background programs.

On-Line Generator Program Response Preparation

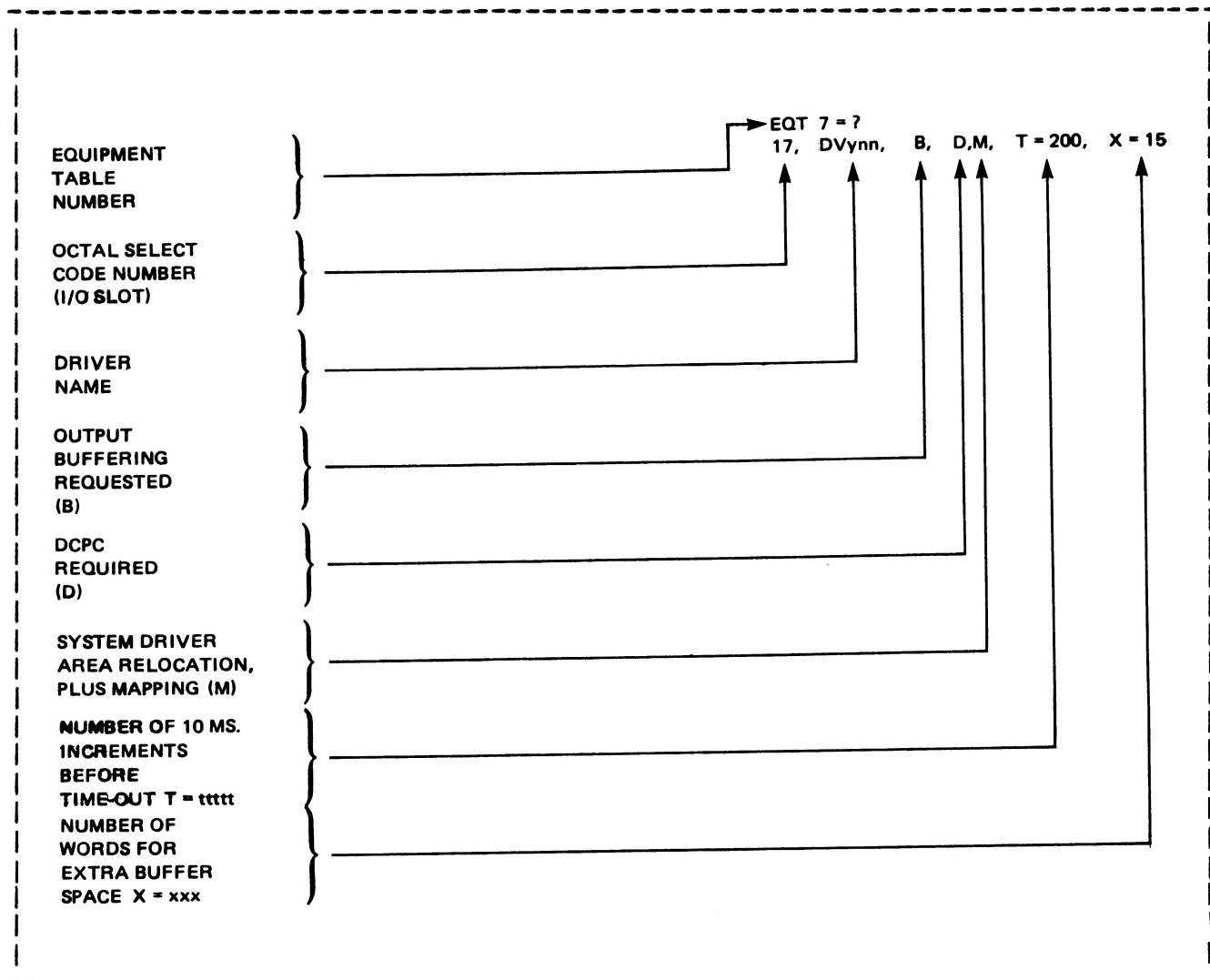


Figure 2-9. EQT Table Example

If T is specified for a device, a value for T must be entered in the appropriate (T=) blank. The value must be a positive decimal number (representing tens of milliseconds) within the range of 1 through 32767. The value entered denotes the maximum amount of time that will elapse before a time-out will be issued for that device. If a device has not interrupted the system within the amount of time specified, it is considered to have timed out and may be set down. Note that time-outs can occur for the system console but it will not be set down. Devices that are controlled by drivers that handle their own time-outs may or may not be set down. For interactive devices, (e.g., terminals) T should not be less than 500.

On-Line Generator Program Response Preparation

If X is specified, a positive decimal value (maximum of three digits) for X must be entered in the appropriate (X=) blank. This value is the number of words that are declared for buffer space (temporary storage) and consequently are allocated to the EQT entry (EQT extension) for the driver's use.

STEP 20 -- DEVICE REFERENCE TABLE

This message is issued prior to requests for logical unit assignments. The Device Reference Table, which specifies the logical unit (LU) numbers, is cross-referenced to the EQT entry numbers. The logical unit request then follows:

1 = EQT #?

Enter the Equipment Table entry number and the subchannel number (if appropriate) associated with Logical Unit number 1.

Following this entry, the logical unit number is incremented by one, and the prompt is redisplayed:

2 = EQT #? This sequence is repeated up to lu 254.

Entries to the Device Reference Table are in the form:

eqt entry, subchannel

where:

eqt entry is the EQT entry number to be associated with the displayed logical unit number.

subchannel is the subchannel number (< or equal to 31) of the device referenced by this entry (if not included, defaults to 0).

The first six logical unit numbers are reserved for system devices, as follows:

LU1 -- system console
LU2 -- system disc subchannel
LU3 -- auxiliary disc subchannel (optional)
LU4 -- standard output unit
LU5 -- standard input unit
LU6 -- standard list unit.

Note that LU8 is recommended for magnetic tape.

Any LU assigned to EQT entry number zero, indicates the bit bucket. This is a system mechanism that allows immediate I/O completion; i.e., the data buffer is immediately read from or written to a nonexistent device.

On-Line Generator Program Response Preparation

Extra logical unit numbers can be assigned EQT entry number zero during generation. These assignments may then be changed on-line, as desired, to reference other EQT entry numbers.

Terminate the Device Reference Table entries using the input data terminator, /E.

STEP 21 -- INTERRUPT TABLE

Following display of this message you enter (in ascending order) interrupt data that link octal select codes to EQT entry numbers or the names of programs that are to be scheduled upon interrupt. Each select code, in ascending order, is referenced back to its EQT entry number in the Equipment Table.

The Interrupt Table (INT) entries have the following form:

select code,option,destination

where:

select code,EQT,n	relates select code to EQT entry number n.
select code,PRG,pppp	causes program pppp to be scheduled upon interrupt.
select code,ENT,entry	causes control (upon interrupt) to transfer to the specified entry point of a Type 0 system program. If the entry refers to a driver entry point, the driver to be entered must reside in the System Driver Area (SDA).
select code,ABS,xxxxxx	places the absolute octal value xxxxxx (instruction code) in the interrupt location. (Do not place anything other than a JMP or JSB or a macro to a microcoded subroutine in this trap cell because an interrupt does not preserve the current status of the memory protect system or the status of the Dynamic Mapping System.)

Terminate the Interrupt Table entries using the input data terminator, /E.

For example, assume that EQT entry number 1 (the first EQT entry) for a 7905/7906/7920/7925 disc was assigned select code 11,DVR32,D. Then, in the Interrupt Table, select code 11 must be referenced to EQT entry number 1, which contains the relocated address of DVR32. DVR32 then will be entered upon interrupt. The format for this Interrupt Table entry is shown in Figure

2-10.

For devices or subsystems that have more than one I/O card, refer to the I/O card or subsystem documentation covering that device or driver for more information regarding Interrupt Table entries. In any case, each I/O card must have an Interrupt Table entry. Note that interrupt location 4 (power fail) may be changed from a HALT 4 (102004) to an ENT entry if a power fail routine is included in your system. For example:

4,ENT,\$POWR

(\$POWR is the entry point in the power fail routine.)

The last part of the Table Generation Phase requires no operator input. At this point in the generation, Table Area I modules are relocated and mapped according to the options that were specified during the Program Input Phase.

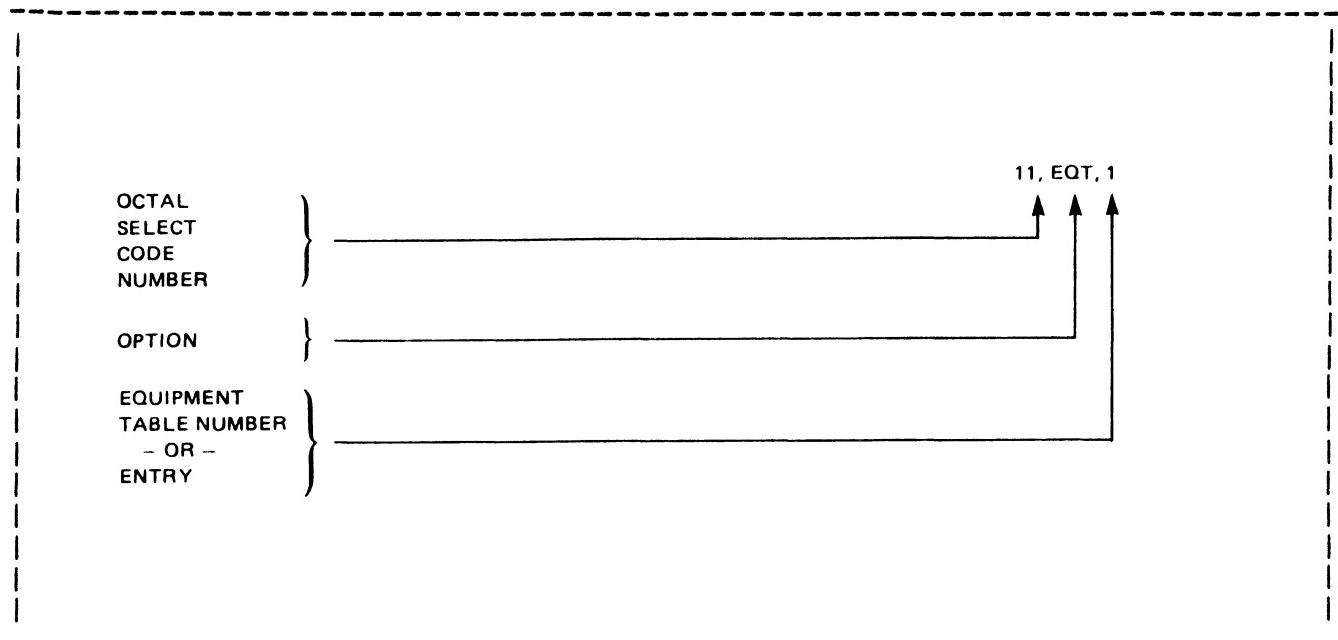


Figure 2-10. Interrupt Table Example

System Boundaries Phase

The planning of generation responses may be difficult beyond this point because some of the responses are based on generation-specific information not yet known to the user. Refer to the System Manager's Manual for more information concerning this phase of system generation. (Refer to the example given in Figure 2-11 as you follow the steps in this phase.)

After Table Area I modules are relocated, the generator prints:

```
STEP 22 -- DRIVR PART 00002
          CHANGE DRIVR PART?
```

The generator reports the two-page default size of the driver partitions and asks for any change.

To change the size of the driver partitions, enter a decimal number of pages greater than the reported value and less than 17. The number entered here will be the total number of logical pages to be allocated to the driver partition (e.g., if a 5 is entered, the driver partition will be five logical pages long). Otherwise, enter a 0. The driver partition size should be increased if user-written drivers are larger than the driver partition default size; otherwise the generator will be aborted when an attempt is made to relocate such a driver.

At this point, driver partition #1 is relocated and the generator prints the driver partition number along with its starting physical page number:

```
DP 01 <<PAGE XXXXX>>:
DVy3n map here
```

The system disc driver will be relocated first into driver partition #1. If space remains between the end of the disc driver and the end of the driver partition, the generator will relocate any other drivers that will fit into the partition. The remaining drivers will be relocated into the System Driver Area (if so specified) or into additional driver partitions.

Once driver partition #1 has been relocated, the generator prints:

```
SUBSYSTEM GLOBAL AREA <<PAGE XXXXX>>:
```

and the SSGA modules (type 30) are relocated.

On-Line Generator Program Response Preparation

(22)	DRIVR PART 00002 CHANGE DRIVR PART? <u>0</u>	(dec. # of pages) (increase driver partition size?) (enter dec. # of pages > reported value and < 17, otherwise 0)
DP 01 <<PAGE XXXXX>> : DVY3 x map here		(load map for system disc driver plus any other drivers that will fit in this driver partition)
(23) RT COMMONxxxxx CHANGE RT COMMON? <u>100</u>		(dec. # of words) (change real-time COMMON?) (enter dec. # of WORDS > reported value, otherwise 0)
RT COMMON ADD xxxx		(octal address)
(24) BG COMMONxxxxx CHANGE BG COMMON? <u>1</u>		(reported in dec. words) (change background COMMON?) (enter dec. # of PAGE increments - 1024 words each, otherwise 0)
BG COMMON ADD xxxx BG COMMONxxxx		(octal address)

Figure 2-11. Sample Boundaries Phase Worksheet

STEP 23 -- RT COMMONxxxxx
CHANGE RT COMMON?

The generator reports the default size of Real-Time COMMON in decimal number of words and asks for any change. The default size will reflect the largest amount of blank Real-Time common declared by any programs specified during the program input phase. Real-Time COMMON should be increased if any programs to be loaded on-line will declare more Real-Time common than the default size reported by the generator.

To change the size of Real-Time COMMON, enter a decimal number of WORDS greater than the reported value. Otherwise, enter a 0.

Then, the generator reports the first word address of the Real-Time COMMON area:

RT COM ADD xxxx

On-Line Generator Program Response Preparation

STEP 24 -- BG COMMONxxxx
CHANGE BG COMMON?

After allocating the defaulted size of Background COMMON, the generator automatically aligns the end of this area to the next page boundary, making use of otherwise wasted space (i.e., assigns the space to Background COMMON). See Figure 2-12.

After reporting the resulting size of Background COMMON, the generator asks for any requested change to this size. To change the size of Background COMMON, enter the decimal number of PAGE increments (1024 words each). Otherwise, enter a 0. Background COMMON should be increased if any programs to be loaded on-line will require more background common than the default size reported by the generator.

At this point, the generator reports the first word address of the Background COMMON area:

BG COMMON ADDxxxx

Then the generator reports the total Background COMMON size (in decimal words):

BG COMMONxxxx

System and Program Loading Phase

Following the BG COMMONxxxx report, the generator relocates the System Driver Area and prints SYSTEM DRIVER AREA <<PAGE XXXXX>>:, followed by the appropriate mapping of the these drivers. The mapping options specify the reporting of names, entry points, and link address of a relocated program. (Refer to the example given in Figure 2-13 as you follow the steps in this phase.) The heading TABLE AREA II <<PAGE XXXXX>>: is printed where XXXXX is the starting physical page.

On-Line Generator Program Response Preparation

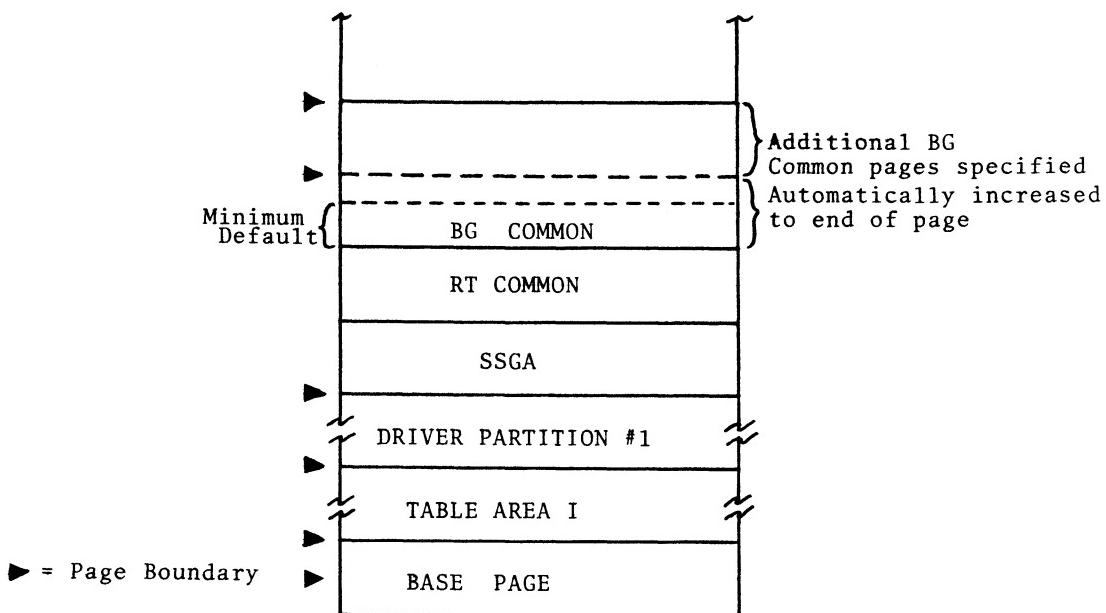


Figure 2-12. BG Common Configuration

On-Line Generator Program Response Preparation

TABLE AREA II <<PAGE XXXXX>> :

- (25) # OF I/O CLASSES?
64 (dec. # from 1 to 255; typical entry would be 10)
- (26) # OF LU MAPPINGS?
10 (dec. # from 1 to 255; typical entry would be 10)
- (27) # OF RESOURCE NUMBERS?
32 (dec. # from 1 to 255)
- (28) BUFFER LIMITS (LOW, HIGH)?
100, 400 (in words, suggested entry would be 100, 400)
- (29) XXXX LONG ID SEGMENTS USED
OF BLANK LONG ID SEGMENTS?
32 (# USED)
(“long” ID segments)
(total # should be from 1 to 254)
- (30) XXXX SHORT ID SEGMENTS USED
OF BLANK SHORT ID SEGMENTS?
50 (# USED)
(total # should be from 1 to 256)
- (31) XXXX ID EXTENSIONS USED
OF BLANK ID EXTENSIONS?
4 (# USED)
(total # should be from 1 to 254)
- (32) MAXIMUM # OF PARTITIONS?
32 (dec. # ≤ 64)

Figure 2-13. Sample Sys and Prgm Loading Phase Worksheet

STEP 25 -- # OF I/O CLASSES?

Enter the number of classes required for Class I/O. Enter a number in the range of 0 through 255 (note that a "0" is changed to a "1").

Class numbers are used in the following operations:

- I/O operations without wait. Programs using class I/O can proceed with execution even though their I/O requests have not completed.
- Program to program communication. Class I/O requests can be used to transmit data and synchronize communication between programs.

The number of class numbers allocated in your system will depend on user application program requirements and the HP supported subsystems used. There must be one class number allocated for each class get call simultaneously outstanding. For the class I/O requirements of HP supported software, refer to the RTE-IVB System Managers Reference Manual, and appropriate subsystem manuals and configuration guides. A minimum entry of 10 is suggested.

The allocated number of classes will determine the size of the system class table, \$CLAS, located in Table Area II. There is one table word allocated per class number.

STEP 26 -- # OF LU MAPPINGS?

This entry specifies the size of the Batch Switch Table that cross-references real or spool logical unit numbers to user-specified logical unit numbers within batch jobs. Enter a number in the range of 0 through 255 (note that a "0" is changed to a "1").

The number entered here determines the maximum number of SL commands allowed in a batch job initiated outside the session monitor environment. The Batch Switch Table, \$LUSW, located in Table Area II, contains one word per LU switch entry. Refer to the RTE-IVB System Manager's Manual (Spool System Generation Chapter) for specific LU mapping requirements. A typical entry here would be 10. If batch jobs will not be initiated outside the session environment (i.e., from the system console) enter 0.

STEP 27 -- # OF RESOURCE NUMBERS?

Enter the required amount of Resource Numbers (RN's). There must be one RN for each resource to be controlled simultaneously by cooperating programs. Enter a number in the range of 1 through 255 (a 0 is changed to a 1).

On-Line Generator Program Response Preparation

Resource numbers provide the capability of synchronizing programs that access the same resource. The resource might be a device, a table in memory, a file, another program, or subroutine. The number of RNs allocated in the system should reflect:

- User application program RN usage. Enough RNs should be allocated to accomodate the maximum number of application programs using RNs or LU locks at one time.
- Subsystem RN usage. Many HP supported programs make use of RNs (e.g., LOADDR, FMGR, FTN4, ASMB, XREF, RT4GN, etc.) Most of these programs deallocate resource numbers when finished. There should be one resource number allocated for each program (or copy of the program) running concurrently. For specific utility and subsystem RN requirements, refer to the RTE-IVB System Manager's Manual and appropriate subsystem and configuration manuals.

A minimum entry of 10 is suggested. The allocated number of resource numbers will determine the size of the system resource number table, \$RNTB, located in Table Area II. There is one table word allocated per RN.

STEP 28 -- BUFFER LIMITS (LOW,HIGH)?

Enter the lower and upper buffer limits (decimal words) for your system.

Setting these limits here can prevent an inoperative or slow I/O device from monopolizing System Available Memory. Each time a buffered I/O request is made (Class I/O requests are buffered), the system totals the lengths of all buffers for I/O requests queued to that EQT entry and compares the number to the upper limits set here (or by the on-line system command, BL). If the sum is less than the upper limit, the new buffered request is added to the queue. If the sum is larger than the upper limit, the requesting program is suspended in the general wait (Status=3) list.

When a buffered I/O request completes, the system adds up the remaining words in I/O requests queued to that EQT entry and compares the number to the lower limit set here (or by the BL command). When the sum is less than the lower limit, any programs suspended for exceeding the buffer limits on this EQT are rescheduled and may reattempt their request.

A suggested entry of 100 and 400 can be entered and may later be changed on-line with the BL command.

STEP 29 - XXXX LONG ID SEGMENTS USED # OF BLANK LONG ID SEGMENTS

Enter the number of ID segments required in addition to the XXXX long ID segments allocated to programs relocated during generation. Note that a 0 is automatically changed to a 1 to allow on-line loading of at least one program. The total number of long program ID segments, including memory resident and disc resident programs, must be equal to or less than 254.

An ID Segment is a table, associated with each program known to the operating system, used to keep track of the program's name, priority, status, and other characteristics. Blank ID Segments are allocated to identify programs added to the system after it is operational. The following considerations should be taken into account when allocating the number of blank ID segments for the system:

- Permanent Program Usage. One blank ID Segment is required for each program that will be permanently added on line by the relocating loader (LOADR). Therefore, enough blank ID segments should be allocated to accommodate all user application programs and HP supported programs to be permanently added to the system online. Once an ID segment is allocated to a permanent program, its space cannot be recovered unless the program is permanently purged with LOADR (PU option).
- Temporary Program Usage. One blank ID segment is required for each program loaded on line as a "temporary" program by LOADR. Programs are loaded as "temporary" during program development, to create FMP type 6 files, or if they are used infrequently. No permanent record is made of them on disc. Temporary programs are removed from the system by the OF, name, 8 operator command. This will free the ID segment for future system use.
- Type 6 File Usage. Blank ID segments are required for each program residing on a type 6 file made available for execution by file manager RP and RU commands. These programs are removed from the system by the OF (described above) or RP command. This will free the ID segment for future system use.
- Multi-Terminal Environment. In systems using the Multi-Terminal Monitor (MTM) or Session Monitor (SM) software packages, blank ID segments must be allocated for each MTM or SM terminal on the system. The number of ID segments allocated per terminal will depend on the number of blank ID segments you want to allocate for program copies. Normally a blank ID segment must be allocated for each copy of FMGR. At least one additional ID segment should be allocated per terminal for programs restored (RP) or run (RU) by the terminal's copy of FMGR. Note that in SM, blank ID segments occupied by temporary and RP'ed programs at log-off are returned to the system for future use.

On-Line Generator Program Response Preparation

In summary, the number of blank ID segments required in your system can be estimated as follows:

(# permanently added progs.)+(max # of temporary and RP'ed programs in system at one time)+(# terminals * # ID segments required per terminal).

For example, a typical system might require:

(10 permanently added progs)+(10 temporary and RP'ed progs)+(5 terminals* 3 segments per terminal)=35 blank ID segments.

Each blank ID segment requires 34 words in Table Area II (33 word ID plus one keyword).

STEP 30 - XXXX SHORT ID SEGMENTS USED
OF BLANK SHORT ID SEGMENTS?

Enter the number of blank "short" ID segments required in addition to the XXXX short ID segments allocated to programs relocated during generation. These ID segments have ten words (nine-word ID plus one keyword) and are used for real-time and background program segments. One short ID segment is required for each program segment. If a segmented program on-line load is performed, and there are no blank short ID segments available, 34-word long ID segments will be used (if they are available) for the segments.

For a "worst case" estimate of your blank short ID segment requirements, determine the total number of segments to be used by user application programs and HP software at any given time. Short ID segments are used by programs added on-line via permanent loads, temporary loads, and RP commands (see step 29). Note that copies of segmented programs share the same short ID segments.

This estimate will allow all segmented programs in the system to be active concurrently. If this is not a requirement, less blank short ID segments can be allocated. For the short ID segment requirements of HP utilities and subsystems, refer to the RTE-IVB System Manager's Manual, the appropriate subsystem manuals, and configuration guides. Short ID segments are located in Table Area II.

STEP 31 - XXXX ID EXTENSIONS USED
OF BLANK ID EXTENSIONS?

Enter the number of blank ID segment extensions required in addition to the XXXX ID extensions allocated to EMA programs relocated during generation. One blank ID extension is required for the on-line load of each EMA program. (Note that a 0 entered here will automatically be changed to a 1.)

On-Line Generator Program Response Preparation

An EMA program cannot be loaded on-line if there are no blank ID extensions available. The number allocated should reflect the estimated maximum number of EMA programs to be loaded on-line in the system at any one time. Each ID extension is four words (three words plus one keyword) in length and is located in Table Area II. A suggested entry here is five ID extensions.

STEP 32 - MAXIMUM # OF PARTITIONS?

Enter the maximum number of program partitions to be allowed in the system. Enter a number in the range of 0 through 64.

The actual number of defined partitions is determined in Step 34 when the remainder of physical memory is divided into partitions. It is possible to define (in Step 34) fewer partitions in the system than you specify here (e.g. you could enter a 64 here, but only define five partitions in Step 34). Partitions can be redefined by the reconfigurator at system startup, but the total number of partitions cannot be changed. If you are unsure of your requirements, a guideline for determining the maximum number of partitions is:

(# pages physical memory ever to be included in system)/12

The number entered in this step will determine the number of entries in the partition definition table, \$MATA, located in Table Area II. Seven words are allocated per entry.

After the above question is answered, the generator prints the following headings and relocates the corresponding modules. (Note that the Load Maps generated will be dependent on the MAP command in effect during the relocation phase, see Step 16a).

TABLE AREA II MODULES

Table Area II (type 13) modules are relocated after memory area is reserved for the tables described above.

SYSTEM <<PAGE XXXX>>

The RTE operating system modules are relocated. The generator will relocate here all type 0 modules except drivers (since drivers are associated with an EQT entry). After the operating system, the reconfigurator (type 16) module is relocated.

PARTITION DRIVERS

DP 02 <<PAGE XXXXX>>

DP 03 <<PAGE XXXXX>>

.

.

.

On-Line Generator Program Response Preparation

Partition resident drivers are relocated next. These will be type 0 modules with an EQT associated with them (without the M or S EQT parameters). As many drivers as will fit are relocated into a driver partition. If the generator discovers a driver that is larger than the specified driver partition size (see Step 23), the generation will be aborted with a GEN ERR 59.

Should an additional driver overflow the logical address space reserved for a driver partition (because of subroutines appended during relocation), RT4GN will issue the message:

DRIVER PARTITION OVERFLOW

The relocation of the driver causing the overflow will be ignored, and the driver will be re-relocated into a subsequent driver partition. Note that no operator intervention is required. After the above message is issued and backup is done, the generator scans for other driver(s) that may be relocated into this driver partition.

MEMORY RESIDENT LIBRARY <<PAGE XXXX>>

The memory resident library contains all type 14 force-loaded modules, and all Type 6 modules referenced by Type 14 modules or memory resident (Type 1) programs.

Note that a pseudo-load of all memory resident programs is done at this time in order to send all referenced Type 6 subroutines into the memory resident library. If a relocation error occurs for a memory resident program, it will be duplicated here.

MEMORY RESIDENTS <<PAGE XXXX>>

The generator relocates the memory resident programs.

RT DISC RESIDENTS

Then the generator relocates the real-time disc resident (Type 2) programs.

BG DISC RESIDENTS

Finally, the generator relocates the background disc resident programs. Type 3 background programs are relocated first, followed by Type 4 background programs.

Partition Definition Phase

When relocation is completed, the generator prints a report of program partition requirements for the real-time and background disc resident programs. (Refer to the example given in Figure 2-14 as you follow the steps in this phase.) Type 4 background disc resident programs will have an "*" appended to the display line. Programs declaring EMA will have an "E" appended to the display line. The page requirements displayed for EMA programs include the declared EMA page size, or a 1 for defaulted EMA size (meaning that the program declared EMA, but no size was specified). These reports are in the form:

RT PARTITION REQMTS:

```
program name xx PAGES
program name xx PAGES
.
.
program name xx PAGES    E
```

BG PARTITION REQMTS:

```
program name xx PAGES    *
.
.
program name xx PAGES    E
```

The page count reported for each program is the number of pages they occupy in memory (including base page).

Next, the generator reports the largest addressable program size (excluding EMA) for Type 4 BG programs both with and without COMMON, and for RT and Type 3 BG programs having Table Area II in their address space. The size includes one page for base page. This report is in the form:

MAXIMUM PROGRAM SIZE:

```
W/O COM xx PAGES
W/ COM xx PAGES
W/TA2  xx PAGES
```

You can declare partitions larger than the reported number of pages, but the extra pages will be accessible only by EMA programs.

STEP 33 - SYS AV MEM: xxxxx WORDS

ENTER 1ST PARTITION PAGE: XXXXX(DEFAULT)TO YYYYYY:

The generator reports the default size (in decimal words) of System Available Memory (from the end of Table Area I and from the overlay of the system reconfiguration program). Refer to Figures B-1 and B-2 in Appendix B to locate these areas.

On-Line Generator Program Response Preparation

Partition Definition Phase

RT PARTITION REQMTS:

.

.

.

(generator lists page requirements)

BG PARTITION REQMTS:

.

.

.

MAXIMUM PROGRAM SIZE:

W/O COM xx PAGES
W/ COM xx PAGES
W/ TA2 xx PAGES

SYS AV MEM: xxxxx WORDS

(reported in decimal words)

(33) **ENTER 1ST PART PAGE: XXXXX (DEFAULT) TO YYYYY:**

(enter dec. pages # value between XXXXX and YYYYY,
otherwise 0 - for default value XXXXX)

SYS AV MEM: xxxxx WORDS

(new size of SAM reported, decimal words)

PAGES REMAINING: xxxxx

(pages remaining for partitioning)

(34) **DEFINE PARTITIONS:
PART 01, XXXX PAGES?**

3 , RT , _____

(see manual about subpartitions)

(prompts to maximum of 64, displaying # pages remaining,
may ask for SUBPARTITIONS)
(decimal page size, type ,R)

PART 02, XXXX PAGES?

5 , BG , _____

PART 03, XXXX PAGES?

6 , BG , _____

PART 04, XXXX PAGES?

9 , BG , _____

PART 05, XXXX PAGES?

11 , BG , _____

PART 06, XXXX PAGES?

15 , BG , _____

PART 07, XXXX PAGES?

19 , BG , _____

(terminate your final entry with a /E)

Figure 2-14. Sample Partition Definition Phase Worksheet

On-Line Generator Program Response Preparation

PART 08, XXXX PAGES?

100, BG, _____

SUBPARTITIONS ?

YES, _____

PART 09, XXXX (YYYY) PAGES?

15, S, _____

(subpartition mode - the number
in parenthesis indicates the number of pages remaining
in the mother partition)

PART 10, XXXX (YYYY) PAGES?

15, S, _____

—
15, S, _____

—
27, S, _____

—
28, S, _____

—
200, BG, _____

—
YES, _____

—
15, S, _____

—
20, S, _____

—
20, S, _____

Figure 2-14. Sample Part. Def. Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

- 20 , s , -----

- 20 , s , -----

- 100 , BGM , -----

- 25 , s , -----

- 1E , -----

-

-----, -----, -----

-

-----, -----, -----

-

-----, -----, -----

-

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-

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-

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Figure 2-14. Sample Part. Def. Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

(35) MODIFY PROGRAM PAGE REQUIREMENTS?

-

(generator prompt)

FMGR , 15

(program name, decimal # of pages)

LOADR , 15

(terminate your final entry with a /E)

EDITR , 11

ZE , _____

-

_____ , _____

-

_____ , _____

-

_____ , _____

-

_____ , _____

(36) ASSIGN PROGRAM PARTITIONS?

IE , _____

(generator prompt)

(program name, partition #)

-

_____ , _____

(terminate your final entry with a /E)

-

_____ , _____

-

_____ , _____

SYSTEM STORED IN FILE

SYS SIZE: ttt TRKS, sss SECS (xx SECTORS/TRACK)

= XXXXXX BLOCKS (128 WORDS/BLOCK)

RT4GN FINISHED

xxxx ERRORS

Figure 2-14. Sample Part. Def. Phase Worksheet (Cont.)

On-Line Generator Program Response Preparation

The generator reports the page number of the first physical memory page available for user partitions as XXXXX and allows you to increment this if you wish.

To change the first page available for partitions, enter a decimal page number value (between XXXXX and YYYYY inclusive), specifying the starting page for partitioning. Otherwise, enter a 0 and the default value XXXXX will be assumed.

Any pages of memory skipped over are allocated to SAM (1024 decimal words per page).

The new size of SAM (in decimal words) is reported:

SYS AV MEM:xxxxx WORDS

Next, the decimal number of pages of physical memory remaining for partitioning is reported:

PAGES REMAINING:xxxxx

The user may or may not wish to allocate additional space for SAM, depending on the use and type of system being generated. The size of SAM should be determined by site-specific needs; however, the user should bear in mind that System Available Memory will be used for the following items:

- Buffered Output. SAM will be used as an output buffer area for buffered devices, that is, devices that have automatic output buffering enabled (i.e., B option set in their EQT entry). The System Manager should generate enough system available memory in the system for each buffered device. On output operations the system will use SAM as a temporary buffer area before outputting information to the device. The maximum amount of SAM used for each device will be specified by the high buffer limit (generator Step 28). To compute your worst case SAM buffer usage, multiply the number of buffered devices in your system by the high buffer limit. This amount of SAM may or may not be required depending on the degree of I/O activity in your system.

A more realistic estimate of SAM requirements can be obtained by the formula: $B*(A/B)*L$.

where:

B is the number of buffered devices in your system.

A is the estimated maximum number of buffered devices being output at any one time.

L is the amount of buffer storage used per device. If the rate of program output is significantly faster than the device can accept (as is normally the case), L will be the system high buffer limit.

For example, if a system has 10 buffered terminals, 5 of which will be output to any one time, and a high buffer limit of 400, the amount of additional SAM required for buffering is $10*(5/10)*400=2K$ words.

- Class I/O. All Class I/O read, write, and control requests are buffered in SAM. User application programs may use class I/O for device I/O (i.e., I/O without wait) or interprogram communication (i.e. "mailbox" I/O). The amount of SAM used for this purpose will depend on the number and length of class buffers residing in SAM at any one time. A class buffer will reside in SAM from the time it is sent to SAM with a class I/O call until it is returned with a Class GET call. Specifically, you may want to determine:
 - * What mix of user application programs using Class I/O will be active simultaneously
 - * What size class buffers will be used in these programs
 - * How many class buffers will be outstanding at any one time

Note that each class buffer in SAM requires space for an 8 word header in addition to the buffer specified in the EXEC call.

- Scheduling String Passage. When programs are scheduled via the File Manager RUN or operating system RUN or ON commands, the entire Command String is stored in SAM so that it may be retrieved later by the scheduled program. Once retrieved, the space is freed for other uses. Buffers may also be passed to scheduled programs in the schedule EXEC calls.

The amount of SAM required for each string buffer is usually not large (10-40 words). Furthermore, for programs that retrieve their scheduling string (most HP utilities), the buffer will be in SAM for only short periods.

- Reentrant I/O and reentrant subroutine processing. When I/O is performed from a temporary data block (TDB) inside a reentrant subroutine, the TDB is moved into SAM. This allows the calling program to be swappable. Most HP subsystems (e.g. FMGR, EDITR) use this technique when performing I/O to the terminal. In addition, programs using the FORTRAN formatter use reentrant I/O. A guideline for estimating your SAM requirements in this regards is:

(Number of terminals in system) * (Buffer Length).

On-Line Generator Program Response Preparation

Normally, the buffer length is approximately 45 words. For example, if program development will be done on ten terminals concurrently, $10 \times 45 = 450$ additional words of SAM should be allocated for reentrant I/O.

Besides reentrant I/O, reentrant subroutines are used when subroutines are shared by more than one program. These subroutines will be located in either the Memory Resident library or SSGA. Reentrant subroutines used in this manner require SAM for their reentrant tables and temporary data blocks. The amount of SAM used by a reentrant subroutine is dependent on the number of programs calling the subroutine at any one time. If you will be generating reentrant subroutines in your system, you may wish to allocate additional SAM for reentrant processing. A rough guess/estimate, of your SAM requirements can be obtained by: $N * (\text{average TDB size})$. Where N is the estimated number of programs using reentrant subroutines.

- HP Subsystem Usage. In addition to using SAM in the ways described above, several HP subsystems (e.g. Session Monitor, DS/1000) allocate blocks of SAM directly from the operating system. These blocks are allocated at subsystem initialization and are used for table storage, pointers, etc. Refer to the RTE System Manager's Manual, appropriate subsystem manuals, and configuration guides for subsystem SAM requirements.

The above guidelines are designed to give you a rough estimate of your SAM requirements. If more SAM is required at any one point than you have generated into your system, you will cause those programs requesting SAM to go into memory suspend (state 4), thus degrading system performance. If this occurs frequently, it is suggested that additional SAM be allocated to the system by running the RTE reconfigurator program at system startup. Refer to the RTE-IVB System Manager's Manual for details.

STEP 34 - DEFINE PARTITIONS:

The number of remaining memory pages reported in Step 33 must now be divided into real-time and/or background partitions.

Following the printing of this heading, the generator prompts you for the definition of your first partition, along with the number of remaining pages.

PART 01, XXXX PAGES?

On-Line Generator Program Response Preparation

Enter the partition definitions in the following form:

size,type[,R]

where:

size is the partition size in number of pages (decimal). A partition must include enough pages for the program, plus one page for the program's base page.

type is RT for a real-time partition, RTM for a real time mother partition, BG for a background partition, BGM for a background mother partition, and S for a subpartition

R is the "reserve" flag. If specified, the partition may be used only by programs specifically assigned to it (see Step 36).

Following each entry (including subpartition definitions), the partition number is incremented by one, and the prompt is redisplayed:

PART 02, XXXX PAGES?

Terminate the partition definition list using a /E.

If you define a BG or RT partition to be larger than the maximum program size declared in Step 32 (i.e., W/O COM XX PAGES), the generator will prompt:

SUBPARTITIONS?

If you respond with a NO to the subpartition query, the generator will define a regular partition of the requested size and type. In this case it is the user's responsibility to manage the additional memory beyond the 32K words of logical memory. This may require the user to lock himself into memory to avoid the loss of data integrity during a program swap.

If you respond YES to the subpartition query, or have specifically requested a mother partition by specifying BGM or RTM, the generator will define a mother partition of the requested size and enter subpartition mode. It will now expect you to divide the mother partition into subpartitions (S type). Note that the sum of the subpartition sizes cannot exceed that of their mother partition. A subpartition will be the same type (i.e. RT or BG) as its mother partition. The generator will exit subpartition mode when you define the next RT or BG partition. The following is displayed when in the subpartition mode:

PART YY, XXXX, (ZZZZ) PAGES?

The number in parenthesis indicates the number of pages remaining in the mother partition.

On-Line Generator Program Response Preparation

The sum of all regular or mother partition sizes (i.e. all partitions defined with either RT or BG) must equal the number of pages allocated for partitioning reported in Step 33 (i.e. PAGES REMAINING XXXXX).

It may not be possible to completely plan partition sizes until the program requirements and the number of remaining pages are actually reported by the generator.

A program cannot be dispatched for execution unless a partition of sufficient size is defined and available (not reserved for the exclusive use of other programs).

The user must determine the mix of real-time and background partitions of appropriate sizes subject to available main memory and the need of their particular applications. The purpose of having two classes of partitions is to prevent competition for main memory between background programs (typically involved in program development and other non-time critical applications) and real-time programs. Note that the class of a partition does not imply any special capability.

In some situations, placing all partitions in a single class may be best. This allows free competition for main memory between all disc programs, subject to program priority and size requirements.

Undesired competition for partitions can be prevented by assigning programs to specific partitions. This could, for example, keep a very small program out of a large partition. Assignments can cross class boundaries; e.g., a real-time program can be assigned to run in a background partition, but such a program would still have all the attributes of a Real-Time program.

Subpartitions provide optimized use of memory, since non-EMA programs can execute in the subpartitions while programs that use EMA are not running (or are suspended) in the mother partition. If a program with EMA should request use of the mother partition while non-EMA programs are executing in the subpartitions, more swapping time (to swap out the programs in the subpartitions) is obviously required, so the user must decide which alternative is best for his program applications. If the BGM & RTM commands are used to break up large partitions into subpartitions, it should be noted that a background or real-time program will not execute in the mother partition unless it is assigned to it.

STEP 35 - MODIFY PROGRAM PAGE REQUIREMENTS?

At this point you can modify disc resident program page requirements. The default size of each program is reported at the beginning of the Partition Definition Phase.

The page requirements of EMA programs cannot be overridden. The size override must not exceed the maximum program address space listed for that type of program. Enter each disc resident program override using the following form:

program name, pages

where:

program name is the name of the program requiring a size override.

pages is the decimal number of pages required to run this program (include one page for the base page).

Terminate the page requirements list using a /E.

Some programs require additional space to dynamically construct buffer areas or symbol tables. Standard RTE programs needing this space are discussed in the RTE-IVB System Manager's Manual. During generation the user must modify the page requirements of these programs before they can be used. Size requirements for non-EMA user supplied programs may also be overridden if necessary. Note that all compilers, generators, loaders and cross reference (XREF) programs will use as much memory as they are assigned. It is possible to temporarily modify page requirements after generation by using the "SZ" command. Refer to the RTE-IVB Programmer's Reference Manual for more information regarding this command.

Note that overriding a program's page requirements will increase the minimum partition size required to execute the program. The system may actually execute the program in a partition larger than this minimum. To the program, however, the "apparent" size of the partition (determined from the System Communication Area during execution) is still the minimum.

The page requirements of a program using EMA cannot be overridden during generation. This may be done only by LOADR during an on-line load.

On-Line Generator Program Response Preparation

An example of entering the program size override follows:

RT4GN,24 The On-Line Generator is assigned 24 pages and will not run in a partition smaller than that size (but can run in a larger partition).

STEP 36 - ASSIGN PROGRAM PARTITIONS?

The last step in the generation procedure is that of assigning programs to run in a specific partition. Enter only those programs you wish to assign to a partition, using the following form:

program name,partition #

where:

program name is the name of the program to be assigned to a partition.

partition # is a number between one and the maximum number of partitions defined in your system (declared in Step 31). A GEN ERR 49 will occur if a program is assigned to a partition that was not defined.

Terminate the program assignment list using a /E.

An example of program assignment to a partition follows:

WHZAT,1 Program WHZAT will execute only in partition #1. Note that other programs can also use this partition unless it was specifically reserved (in Step 35) for WHZAT and assigned only to WHZAT.

Note that the system AS command allows the changing of program assignment after generation.

Mother partitions are used only for those programs using EMA (Extended Memory Area) or for those programs specifically assigned to them. When an EMA program is not assigned to a specific partition it will (by default) execute in a mother partition. Regular partitions will not be used by EMA programs unless specifically assigned to them. (This is true even if the partition is greater than the maximum logical address space.)

On-Line Generator Program Response Preparation

When the generation is completed, the generator reports that the system is stored in a file, followed by a report of the system size in decimal number of tracks and sectors (128 word sectors) and the equivalent total in blocks. The number of errors (FMP and GEN ERR's, excluding UNDEFS) encountered during generation are also reported.

SYSTEM STORED IN FILE
SYS SIZE:ttt TRKS, sss SECS (XX SECTORS/TRACK)
= XXXXX BLOCKS (XXX WORDS/BLOCK)

RT4GN FINISHED

xxx ERRORS

Chapter 3

System Generation

Introduction

The On-Line Generator executes in the minimum software environment that was defined in Chapter 1.

This chapter provides directions for running the RTE-IVB On-Line Generator program (RT4GN) to configure your RTE-IVB system.

It is assumed at this point that you have already planned (with the aid of the instructions and worksheets included in the appropriate documentation) your configuration and actual responses to the generator's queries. Most of the responses required during generation will be taken directly from the worksheets.

Executing the On-Line Generator

The On-Line Generator program (RT4GN) is executed using either the system or FMGR command, RU. You can either create an answer file (disc transfer file or logical unit) that contains the information required by the generator or you can provide this information interactively, via the user console.

The syntax of the RU command used to execute the On-Line Generator is:

```
RU,RT4GN      ,filenm[:sc[:cr]]  
              ,lu
```

where:

filenm is the name of a file that contains a generation answer file

sc is the security code of the file

cr is the cartridge reference number for the file

lu is the logical unit number of the input device (e.g., a mini-cartridge) from which an answer file will be retrieved.

If no input parameters are specified, the generator assumes the interactive mode and displays prompt messages on your console. You respond to these messages by entering information to direct the generator. (Note that in the following examples, the colon characters represent FMGR prompts.)

System Generation

Example:

```
:RU,RT4GN
```

When you enter the RU command in this form, the RTE On-Line Generator program is scheduled for execution in the interactive mode at the user's terminal.

Example:

```
:RU,RT4GN,ANSFIL:KH
```

When you enter the RU command in this form, the RTE On-Line Generator program is scheduled, and generator responses are supplied to RT4GN from a disc answer file named ANSFIL. A security code of "KH" is also specified.

Example:

```
:RU,RT4GN,5
```

When you enter this form of the RU command, the RTE On-Line Generator program is scheduled, and generator responses are supplied from Logical Unit 5.

If the parameter specified in the RUN command is an interactive device (e.g., a terminal), the ECHO option will cause commands and responses to be echoed to that device. (Note that echo is suppressed when the current device is the same as the default device.) Similarly, error messages will be sent, and control may be transferred, to this device.

If the parameter specifies a non-interactive input (e.g., file manager file), the ECHO option will cause messages and errors to be routed to LU 1.

If you wish to generate from an answer file but want the generator's echo and/or error messages to be sent to your terminal, use the terminal as the default input device and then transfer to the answer file.

Example:

```
RU,RT4GN
```

Then the generator will request (at your console):

```
LIST FILE NAME?
```

You can respond with the following:

```
TR,ANSFIL::2
```

RT4GN will then proceed under the direction of your answer file, ANSFIL.

Response and Comments

Standard user responses are entered as a line, followed by a carriage return. Whenever a response is expected, one or more comments may also be entered. A comment begins with an asterisk (*) and terminates with a carriage return. When the generator encounters an asterisk in a line, it considers the remainder of that line to be a non-executable statement. A comment may either be entered on the same line as a response or as a separate line. If the comment is entered as a separate line (or lines), a response line is entered on the following line. Restrictions on the use of comments are given in Chapter 2. Comments are useful when transferring response input from the console to an answer file and also for documentation purposes.

Error Handling

If an error has been made that will not be detected by the on-line generator, such as specifying the wrong EQT number for a certain LU in the Device Reference Table portion of the Table Generation Phase, the error can be corrected by restarting the on-line generator program and specifying the corrected responses interactively or in a corrected answer file.

Error conditions detected by the on-line system generation result in the following two types of numbered error messages:

1. File reference errors that result in an FMP error code, in the form:

FMP ERR-nn filenm

where:

nn is a decimal number equivalent to the FMP error codes that are defined in the Batch-Spool Monitor Reference Manual

filenm is the file name or LU on which the error occurred.

An FMP error may result from incorrect references to the list file, absolute output file, answer file, bootstrap file, scratch file, or a file specified in a RELOCATE command.

System Generation

2. An error condition encountered by the On-Line Generator that results in a generator error code, in the form:

GEN ERR nn

(name)

where:

nn is a positive decimal number

(name) specifies, in some error messages, the program or entry point name further identifying the cause of the error.

All of the numbered error messages are summarized in Appendix G.

Note that after certain errors, control is transferred to the appropriate console for user action (refer to the EXECUTING THE ON-LINE GENERATOR section for details).

On abortive errors ("irrecoverable"; e.g., 00, 17, etc.), RT4GN will purge the absolute output file, scratch file, and boot file (if any) before terminating. The list file and answer file will remain.

When an error occurs on the list file during generation (e.g., the inability to create an extent due to lack of FMGR disc space), the appropriate FMP ERR is reported, in addition to a GEN ERR 22. In such cases, the generator prompts the operator with:

OK TO CONTINUE?

A YES response causes the generation to proceed with the listed output being sent to the user console only. The listed output will go to the console even if a NO was entered in response to the ECHO? query. Note that a TR command does not need to be entered even if command input was being received from an answer file or LU. An FMP -005 error may result on the last record if you attempt to list the file via the File Manager.

A NO response aborts the generation.

The following message is printed by the generator to inform you that a driver partition overflow has occurred on the most recently relocated driver:

DRIVER PARTITION OVERFLOW

This message is for documentation purposes only and tells you to ignore the load map printed (if any) for the last driver relocated. RT4GN will re-relocate this driver into a subsequent driver partition. No operator intervention is required for recovery and no transfer is made to the user console.

Certain error conditions encountered during generation cause one of several unnumbered error messages to be output by the generator. At this point, the generator is suspended until the problem is resolved. The unnumbered error messages that can occur are the following:

GENERATOR WAITING FOR TRACKS

This message is displayed when the generator cannot obtain the necessary scratch tracks. Operation continues when tracks become available (e.g., when another program terminates, releasing tracks).

GENERATOR WAITING ON LIST LU LOCK

This message is displayed when the generator attempts a logical unit lock of the list LU (only if the list device is non-interactive). Operation continues when the logical unit lock can be accomplished (e.g., when another program terminates, releasing the LU lock).

Number Systems

The On-Line Generator uses octal numbers when listing word addresses (including interrupt trap cell locations and device select codes). Your responses that specify word addresses must be entered in octal notation. All other quantities, including page references and reports of number of words, are expressed in decimal notation.

Generator Scratch File

The generator creates a temporary scratch file named @@NM@A that it uses for storing the modified NAM records of either compiled programs or those programs that have their priority/execution interval changed during the Parameter Input Phase. If a file named @@NM@A already exists, the generator increments the last character of the file name (e.g., @@NM@A is incremented to @@NM@B) and tries to create a file with the new name. This process continues (maximum of 26 times) until the generator can create a new file. Before termination, the generator automatically purges (during its clean-up operations) the file that it created. However, the generator does not purge any other file(s) that may exist from other generations.

Sample Generation

The following pages discuss an actual RTE-IVB system generation in a step-by-step procedure. Sample worksheets prepared for this RTE system generation are included in Chapter 2. A sample answer file format for the generation is given in Appendix E, and the listed output (or printout) produced during the generation process is included in Appendix F.

RTE-IVB System Generation Example

RT4GN execution begins following entry of the RU command. Assume the interactive mode in the following example. The generator's queries are shown, followed by the user's responses.

Initialization Phase

When execution begins, the generator requests the namr of the list file or the logical unit number of the device that will receive the listed output from the generator. In this case, a file named LIST4 (cartridge label 1904) is specified:

```
LIST FILE NAMR?  
SYSLI:DB:QQ::450
```

The generator asks if the listed output is to be echoed to the user console:

```
RTE-IV GENERATOR MODEL 92068A 5:41 PM TUE., 1 MAY., 1979  
ECHO?  
YES
```

Next, the generator requests a namr (filesize parameter must be specified) for the output file:

```
OUTPUT FILE NAMR?  
SESSY:DB:QQ::4000 * OUTPUT FILE
```

The generator requests the type of disc on the system for which this generation is produced (destination system):

```
SYSTEM DISC MODEL?  
7925 * 7925 SYSTEM DISC
```

The generator requests the octal select code of the system disc controller:

```
CONTROLLER SELECT CODE?  
11 * CONTROLLER SELECT CODE
```

The generator requests the number of tracks, starting cylinder number, starting head number, number of surfaces, unit number, and number of spare tracks (all decimal) for subchannel 0. Enter these decimal values separated by commas. (Blanks may be freely used to make user responses more readable.)

The generator will continue to display a subchannel number following each entry up to subchannel 31, or until terminated by the entry of the input data terminator, /E. For this example:

MODEL, # TRKS,FIRST CYL #,HEAD,# SURFACES,UNIT,# SPARES FOR SUBCHNL:

* DISC	#TRKS	1ST-CYL	HEAD	#SURFACES	UNIT	#SPARES	
7925,	256,	0,	0,	9,	0,	5	*SUBCHANNEL 0
7925,	1500,	29,	0,	9,	0,	66	*SUBCHANNEL 1
7925,	193,	203,	0,	9,	0,	5	*SUBCHANNEL 2
7925,	193,	225,	0,	9,	0,	5	*SUBCHANNEL 3
7925,	193,	247,	0,	9,	0,	5	*SUBCHANNEL 4
7925,	193,	269,	0,	9,	0,	5	*SUBCHANNEL 5
7925,	193,	291,	0,	9,	0,	5	*SUBCHANNEL 6
7925,	193,	313,	0,	9,	0,	5	*SUBCHANNEL 7
7925,	193,	335,	0,	9,	0,	5	*SUBCHANNEL 8
7925,	193,	357,	0,	9,	0,	5	*SUBCHANNEL 9
7925,	193,	379,	0,	9,	0,	5	*SUBCHANNEL 10
7925,	193,	401,	0,	9,	0,	5	*SUBCHANNEL 11
7925,	256,	423,	0,	9,	0,	5	*SUBCHANNEL 12
7925,	193,	452,	0,	9,	0,	5	*SUBCHANNEL 13
7925,	193,	474,	0,	9,	0,	5	*SUBCHANNEL 14
7925,	193,	496,	0,	9,	0,	5	*SUBCHANNEL 15
7925,	193,	518,	0,	9,	0,	5	*SUBCHANNEL 16
7925,	193,	540,	0,	9,	0,	5	*SUBCHANNEL 17
7925,	193,	562,	0,	9,	0,	5	*SUBCHANNEL 18
7925,	193,	584,	0,	9,	0,	5	*SUBCHANNEL 19
7925,	193,	606,	0,	9,	0,	5	*SUBCHANNEL 20
7925,	193,	628,	0,	9,	0,	5	*SUBCHANNEL 21
7925,	193,	650,	0,	9,	0,	5	*SUBCHANNEL 22
7925,	193,	672,	0,	9,	0,	5	*SUBCHANNEL 23
7925,	96,	694,	0,	9,	0,	3	*SUBCHANNEL 24
7925,	150,	705,	0,	9,	0,	3	*SUBCHANNEL 25
7925,	96,	722,	0,	9,	0,	3	*SUBCHANNEL 26
7925,	96,	733,	0,	9,	0,	3	*SUBCHANNEL 27
7925,	194,	744,	0,	9,	0,	4	*SUBCHANNEL 28
7925,	194,	766,	0,	9,	0,	4	*SUBCHANNEL 29
7925,	194,	788,	0,	9,	0,	4	*SUBCHANNEL 30
7925,	114,	810,	0,	9,	0,	3	*SUBCHANNEL 31

The next request is for the subchannel number of the system disc (Logical Unit number 2). This is the disc on which the absolute code will be stored for execution. The response can be any one of the subchannel numbers assigned to the system. In this case, it is subchannel number 0, as follows:

SYSTEM SUBCHNL?

0

* SYSTEM SUBCHANNEL

System Generation

The generator asks if there is to be an auxiliary disc subchannel (Logical Unit number 3). You may respond with YES, NO, or a decimal value indicating the number of tracks to be allocated to the auxiliary disc. A YES response specifies that the auxiliary disc is on the same disc controller as the system disc, and a request will be made for subchannel number information. A NO response specifies that there is no auxiliary disc. A track count response indicates that the auxiliary disc is to consist of that number of tracks on a disc controller other than the one that supports the system disc, and a request will then be made for the model number of that disc. For this generation:

```
AUX DISC (YES OR NO OR # OF TRKS)?  
YES * AUXILIARY DISC
```

The generator asks for the auxiliary subchannel number:

```
AUX DISC SUBCHNL?  
12 * AUXILIARY DISC SUBCHANNEL
```

Next, the generator requests the octal select code of the Time Base Generator:

```
TBG SELECT CODE?  
10 * TBG SELECT CODE
```

The next prompt asks for the octal select code of the Privileged Interrupt I/O card. In this example there is no card:

```
PRIV. INT. SELECT CODE?  
0 * PRIV. INT. SELECT CODE
```

The generator asks if TABLE AREA II and SDA should be included in the User Map for access by memory resident programs:

```
MEM. RES. ACCESS TABLE AREA II?  
YES * MEM. RES. ACCESS TABLE AREA II
```

Next, the generator asks if any program is allowed to lock itself into the real-time area and/or into the background area:

```
RT MEMORY LOCK?  
YES * RT MEMORY LOCK
```

```
BG MEMORY LOCK?  
YES * BG MEMORY LOCK
```

Next, the amount of swap delay time is requested. This requires the entry of a decimal value representing tens of milliseconds in the range of 0 through 255. In this example:

```
SWAP DELAY?  
50 * SWAP DELAY
```

The generator asks for the physical memory size in decimal pages:

```
MEM SIZE?  
512 * MEMORY SIZE
```

The last prompt in this phase requests the name of the file, or the logical unit number of the device that will receive the bootstrap loader. In this example no bootstrap loader is to be produced:

```
BOOT FILE NAMR?  
0 * BOOT FILE NAMR
```

Program Input Phase

During this phase the generator accepts commands that directs it to the files containing the relocatable modules to be included in the new system. The generator issues a heading that announces the beginning of this phase. The heading is followed by a hyphen character (-) to prompt the entry of an operator command. The hyphen prompt is repeated after the acceptance of each command until you enter a /E to terminate the Program Input Phase. For this example the entries appear as follows:

PROG INPUT PHASE:	Introductory heading
-	Command prompt
MAP ALL	
-	See the RT4GN listed output in Appendix F for a complete list of command entries
LINKS IN CURRENT	
-	
REL,%CR4S1::SM	* RTE-IVB OP SYS
-	
REL.%CR4S2::SM	* RTE-IVB OP SYS
.	
.	
.	
REL,%HELP::SM	* HELP PROGRAM
-	
DISPLAY UNDEFS,TR	If answers supplied from an answer file, would be useful to do a DISPLAY UNDEFS,TR
-	
/E	Terminate this phase
NO UNDEFS	Generator message; no undefined references exist

CAUTION

The value of all undefined externals will be set to zero upon exit from the Program Input Phase. Results are unpredictable if programs that were loaded during generation reference these externals.

Parameter Input Phase

During this phase you can modify the program type, priority, or execution interval, or you can modify the ENT record for any of the programs entered during the previous phase (undefined externals may be given a non-zero value). The generator displays the appropriate heading, after which you enter your changes. The heading is followed by a hyphen character (-) to prompt the entry of the parameter changes. The hyphen prompt is repeated after acceptance of each command until you enter a /E to terminate the parameter entry list.

First, the generator requests any parameter changes:

PARAMETERS	Introductory heading
-	Command prompt
D.RTR,1,1	
-	
WHZAT,1,41	
-	
/E	See the RT4GN listed output in Appendix F for a complete list of entries Terminate this list

Next, the generator asks if there are any entry (ENT) records that you wish to change:

CHANGE ENTS?	Introductory heading
-	Command prompt
TAN,RP,105320	
-	
SQRT,RP,105321	
-	
ALOG,RP,105322	
-	
ATAN,RP,105323	
-	
COS,RP,105324	
-	
SIN,RP,105325	
-	
EXP,RP,105326	
-	
ALOGT,RP,105327	
-	
.	
:	
:	
-	
DVS WP,RP,105473	
-	
/E	

Table Generation Phase

The generator displays a heading to begin the Equipment Table entry portion of this phase. The heading is followed by a prompt asking for the first entry. This prompt is reissued following each of your entries until you terminate the entry list with a /E:

TABLE AREA I

EQUIPMENT TABLE ENTRY

EQT 01?

*

*****TABLE GENERATION PHASE*****

*****EQUIPMENT TABLE*****

*

*****EQUIPMENT TABLE*****

*

11,DVR32,D

* EQT 01 7925 DISC

EQT 02?

12,DVA05,B,X=13,T=12000

* EQT 02 SYSTEM CONSOLE (2645.)

EQT 03?

13,DVA12,B,T=300

* EQT 03 2631 LINE PRINTER

EQT 04?

14,DVR37,B,X=50,T=20000

* EQT 04 HPIB

EQT 05?

15,DVR23,B,D,T=9999

* EQT 05 7970 MAG TAPE

EQT 06?

17,DVA05,B,X=13,T=12000

* EQT 06 2645 TERMINAL

EQT 07?

20,DVA05,B,X=13,T=12000

* EQT 07 2645 TERMINAL

EQT 08?

21,DVA05,B,X=13,T=12000

* EQT 08 2645 TERMINAL

•

•

•

EQT 22?

/E

System Generation

The next table is the Device Reference Table, which determines logical unit number assignments. The generator displays an introductory heading, followed by a prompt for the Equipment Table entry number (and optional subchannel specifications) to be associated with Logical Unit number 1. This prompt is reissued for each logical unit number until you terminate the entry list with a /E:

DEVICE REFERENCE TABLE

```
001 = EQT #?
*
*****DEVICE REFERENCE TABLE*****
*
2                                * LU 01 SYSTEM CONSOLE

002 = EQT #?
1                                * LU 02 SYSTEM DISC (SUBCHANNEL 0)

003 = EQT #?
1,14                             * LU 03 AUX. DISC (SUBCHANNEL 14)

004 = EQT #?
2,1                               * LU 04 LEFT CTU

005 = EQT #?
2,2                               * LU 05 RIGHT CTU

006 = EQT #?
3                               * LU 06 2631 LINE PRINTER

.
.
.

079 = EQT #?
/E                                Terminate this list
```

The next portion of this phase asks you for the Interrupt Table entries for each I/O card select code. The generator displays an introductory heading, after which you may enter the Interrupt Table information. The heading is followed by a hyphen character (-) to prompt the Interrupt Table entries. Except for I/O location 4 (the Power Fail card), the table entries must be in ascending order. The Interrupt Table entry list is terminated with a /E:

INTERRUPT TABLE

Introductory heading
Command prompt

```
-                                Octal select code, option, destination
*
*****INTERRUPT TABLE*****
*
4,ENT,$POWR                         * POWER FAIL
-
```

```

11,EQT,1          * 7925 DISC
-
12,PRG,PRMPT     * SYSTEM CONSOLE
-
13,EQT,3          * 2631 LINE PRINTER

.
.
.

/E

```

System Boundaries Phase

After relocating the Table Area I modules, the generator reports (in decimal number of pages) the default size of the driver partitions and asks for any change:

```

DRIVR PART 00002
CHANGE DRIVR PART?
*
*****SYSTEM BOUNDARIES*****
*
0          * CHANGE DRIVER PART
           0 means there is no change in
           the driver partition size

```

Driver partition #1 and the Subsystem Global Area (SSGA) are loaded next. Then the generator reports the size (in decimal words) of the real-time COMMON area and asks if you want to change the size:

```

RT COMMON 00000
CHANGE RT COMMON?
100          * CHANGE RT COMMON

```

Next, the generator reports the starting address of the real-time COMMON area:

```
RT COM ADD 12000
```

After aligning the end of background COMMON at the next page boundary, the generator reports the defaulted size of background COMMON:

```
BG COMMON 00924
```

The generator then asks if you want to change (in page increments) the size of the background COMMON area:

```
CHANGE BG COMMON?
1          * CHANGE BG COMMON
```

System Generation

At this point, the generator reports the first word address of the background COMMON area:

BG COM ADD 12144

Next the generator reports the total size (decimal) of background COMMON:

BG COMMON 01448

System and Program Loading Phase

After loading the System Driver Area modules, the generator asks you to enter the number of Class I/O numbers to be allocated:

OF I/O CLASSES?

*

*****RESOURCES TABLES

*

64

* # I/O CLASSES

The generator then asks you for the maximum number of LU commands you will allow to be referenced in a single job within the Batch-Spool Monitor (response to this question is derived from requirements described in the Batch-Spool Monitor Reference Manual):

OF LU MAPPINGS?

10

* LU MAPPINGS

Next, the generator requests the number of resource numbers you will allow to be allocated:

OF RESOURCE NUMBERS?

32

* # R.N.'S

Your response to the next question determines the lower and upper limits (in decimal words) for I/O buffering:

BUFFER LIMITS (LOW,HIGH)?

100,400

* BUFFER LIMITS

Now, the generator gives the number of long ID segments used and asks that you enter the number of additional blank long (33-word) ID segments to be allocated in Table Area II for on-line program loading.

0030 LONG ID SEGMENTS USED

OF BLANK ID SEGMENTS?

32

* BLANK ID SEGS

Then, the generator gives the number of short ID segments used and asks you to enter the number of additional blank short (9-word) ID segments to be allocated in Table Area II for on-line background segment loading:

```
0018 SHORT ID SEGMENTS USED
# OF BLANK SHORT ID SEGMENTS?
50                                * SHORT ID SEGS
```

The generator gives the number of ID extensions used and asks you to enter the number of additional ID segment extensions to be allocated in Table Area II for on-line EMA program loading:

```
0000 ID EXTENSIONS USED
# OF BLANK ID EXTENSIONS?
4                                 * ID EXTENSIONS
```

The generator requests that you specify the maximum number of partitions to be defined for this generation:

```
MAXIMUM # OF PARTITIONS?
32                                * PARTITIONS
```

Program loading continues with the appropriate linking and mapping (modules, globals, links) options in effect.

Table Area II modules, system modules, the configuration program, and the remaining partition-resident drivers are relocated to complete the system portion of program loading.

Next, the generator relocates the memory resident library followed by all memory resident programs. All real-time and background disc resident programs are then relocated.

Partition Definition Phase

This phase starts with a list of real-time program partition size requirements:

```
RT PARTITION REQMTS:
AUTOR 02 PAGES
```

System Generation

The generator then lists the background program partition size requirements (Type 4 BG programs are annotated with an "*"):

BG PARTITION REQMTS:

.

.

.

COMPL	10 PAGES	see Appendix F for complete listing
CLOAD	10 PAGES	
READT	16 PAGES	
WRITT	14 PAGES	
HELP	05 PAGES	
ACCTS	18 PAGES	
LOADR	12 PAGES *	

The next report defines the largest addressable program sizes available (including base page):

MAXIMUM PROGRAM SIZE:

W/O COM 28 PAGES
W/ COM 26 PAGES
W/TA2 20 PAGES

Next, the generator reports the decimal size of System Available Memory (the generator automatically allocates to SAM that memory remaining at the end of Table Area I and that memory that was occupied by the reconfigurator program):

SYS AV MEM: 04019 WORDS

The generator then reports the number of the first physical memory page available for partitioning, and you are asked if you want to change this beginning page number in order to increase the size of SAM (in this example the page number is not changed, which results in no increase in the size of SAM):

ENTER 1ST PARTITION PAGE: 00047(DEFAULT) TO 00052:

TR,1
0

SYS AV MEM 04019 WORDS

The generator reports the decimal number of pages remaining for partitioning. This report is followed by a message telling you to define your partitions, and then a prompt is issued that asks for the first partition definition. This prompt is reissued after acceptance of each entry until you enter a /E to terminate the list.

If you define a partition whose size is larger than the maximum user logical address space, then the generator will prompt you for subpartitions, and you respond with a YES or NO.

PAGES REMAINING: 00081

DEFINE PARTITIONS

Introductory heading

PART 01, 0468 PAGES?
3,RT

Command prompt

PART 02, 0465 PAGES?
5,BG

PART 03, 0460 PAGES?
6,BG

PART 04, 0454 PAGES?
9,BG

.

.

.

See the RT4GN listed output in
Appendix F for a complete list
of entries.

PART 30, 0000,(0050) PAGES?
25,S

PART 31, 0000,(0025) PAGES?
25,S

PART 32, 0000,(0000) PAGES?
/E

Terminate this list

Next you are asked if you want to modify page requirements. This query is followed by a hyphen character (-) to prompt the entry of page requirement modifications. The hyphen prompt is repeated after acceptance of each entry until you enter a /E to terminate the list.

MODIFY PROGRAM PAGE REQUIREMENTS? Introductory heading
- Command prompt
FMGR,15
-
LOADR,15
-
EDITR,11
-
/E

The next prompt asks if you want to assign any programs to a partition. The query is followed by a hyphen character (-) to prompt the entry of partition assignments. The hyphen prompt is repeated after acceptance of each entry until you enter a /E to terminate the list.

ASSIGN PROGRAM PARTITIONS?
-
/E

Introductory heading
Command prompt
Terminate this list

System Generation

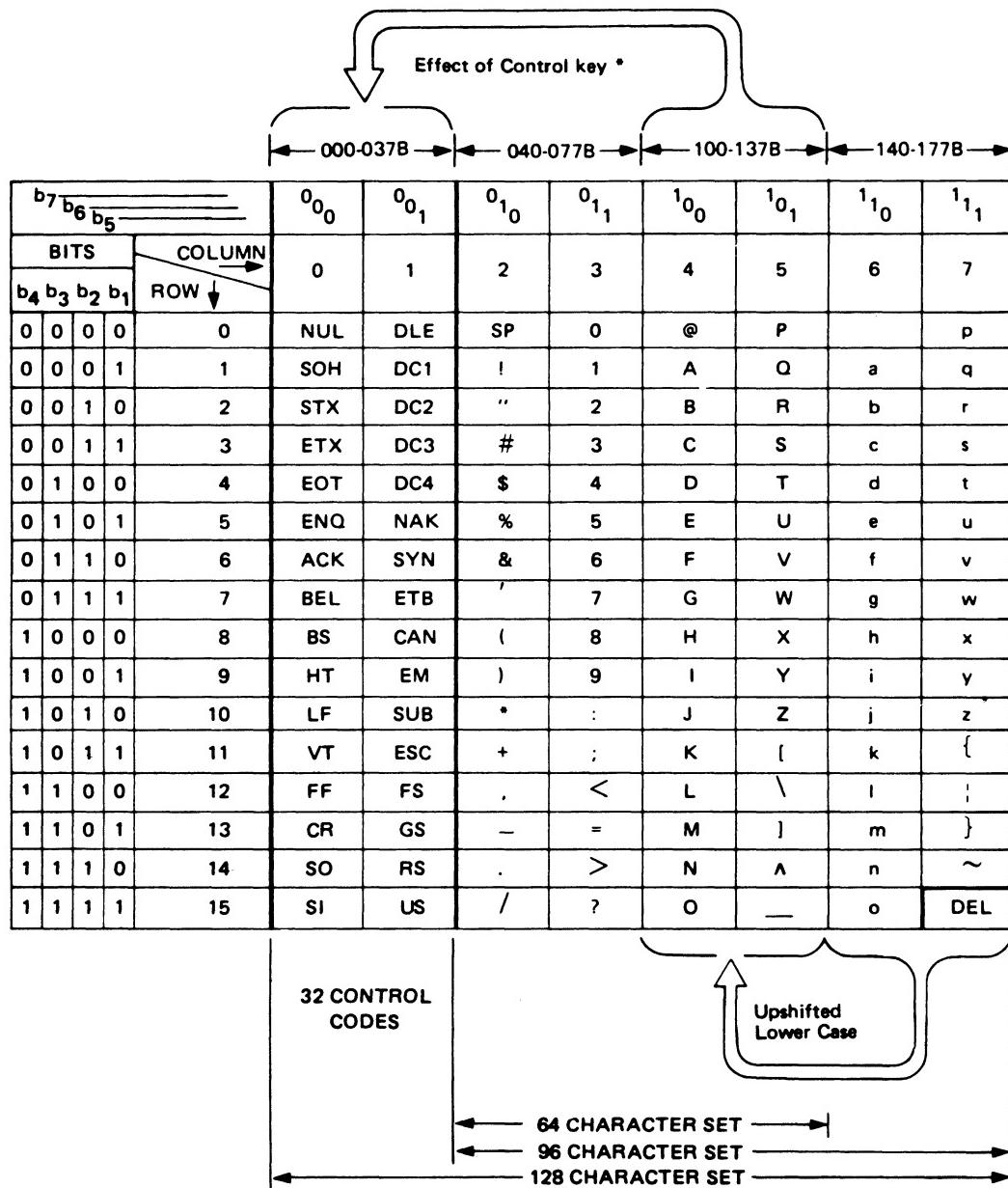
Finally the generator reports that your system is stored in the output file. This report is followed by a report of the system size in tracks and sectors (decimal) and the equivalent number of blocks. The number of errors encountered during the generation is also reported:

SYSTEM STORED IN FILE
SYS SIZE:053 TRKS, 047 SECS (64 SECTORS/TRACK)
= 03439 BLOCKS (128 WORDS/BLOCK)

RF4GN FINISHED
0000 ERRORS

Appendix A

HP Character Set



EXAMPLE: The representation for the character "K" (column 4, row 11) is.

$b_7 \ b_6 \ b_5 \ b_4 \ b_3 \ b_2 \ b_1$ BINARY 1 0 0 1 0 1 1 OCTAL 1 1 3
--

- * Depressing the Control key while typing an upper case letter produces the corresponding control code on most terminals. For example, Control-H is a backspace.

HEWLETT-PACKARD CHARACTER SET FOR COMPUTER SYSTEMS

This table shows HP's implementation of ANSI X3.4-1968 (USASCII) and ANSI X3.32-1973. Some devices may substitute alternate characters from those shown in this chart (for example, Line Drawing Set or Scandinavian font). Consult the manual for your device.

The left and right byte columns show the octal patterns in a 16 bit word when the character occupies bits 8 to 14 (left byte) or 0 to 6 (right byte) and the rest of the bits are zero. To find the pattern of two characters in the same word, add the two values. For example, "AB" produces the octal pattern 040502 (The parity bits are zero in this chart).

The octal values 0 through 37 and 177 are control codes. The octal values 40 through 176 are character codes.

Decimal Value	Octal Values		Mnemonic	Graphic ¹	Meaning
	Left Byte	Right Byte			
0	000000	000000	NUL	▀	Null
1	000400	000001	SOH	⌂	Start of Heading
2	001000	000002	STX	▀	Start of Text
3	001400	000003	ETX	▀	End of Text
4	002000	000004	EOT	▀	End of Transmission
5	002400	000005	ENO	▀	Enquiry
6	003000	000006	ACK	▀	Acknowledge
7	003400	000007	BEL	▀	Bell. Attention Signal
8	004000	000010	BS	▀	Backspace
9	004400	000011	HT	▀	Horizontal Tabulation
10	005000	000012	LF	▀	Line Feed
11	005400	000013	VT	▀	Vertical Tabulation
12	006000	000014	FF	▀	Form Feed
13	006400	000015	CR	▀	Carriage Return
14	007000	000016	SO	▀	Shift Out
15	007400	000017	SI	▀	Shift In } Alternate Character Set
16	010000	000020	DLE	▀	Data Link Escape
17	010400	000021	DC1	▀	Device Control 1 (X-ON)
18	011000	000022	DC2	▀	Device Control 2 (TAPE)
19	011400	000023	DC3	▀	Device Control 3 (X-OFF)
20	012000	000024	DC4	▀	Device Control 4 (TAPE)
21	012400	000025	NAK	▀	Negative Acknowledge
22	013000	000026	SYN	▀	Synchronous Idle
23	013400	000027	ETB	▀	End of Transmission Block
24	014000	000030	CAN	▀	Cancel
25	014400	000031	EM	▀	End of Medium
26	015000	000032	SUB	▀	Substitute
27	015400	000033	ESC	▀	Escape ²
28	016000	000034	FS	▀	File Separator
29	016400	000035	GS	▀	Group Separator
30	017000	000036	RS	▀	Record Separator
31	017400	000037	US	▀	Unit Separator
127	077400	000177	DEL	▀	Delete Rubout ³

Decimal Value	Octal Values		Character	Meaning
	Left Byte	Right Byte		
32	020000	000040		Space, Blank
33	020400	000041	!	Exclamation Point
34	021000	000042	"	Quotation Mark
35	021400	000043	#	Number Sign, Pound Sign
36	022000	000044	\$	Dollar Sign
37	022400	000045	%	Percent
38	023000	000046	&	Ampersand, And Sign
39	023400	000047	'	Apostrophe, Acute Accent
40	024000	000050	(Left (opening) Parenthesis
41	024400	000051)	Right (closing) Parenthesis
42	025000	000052	*	Asterisk, Star
43	025400	000053	+	Plus
44	026000	000054	,	Comma, Cedilla
45	026400	000055	-	Hyphen, Minus, Dash
46	027000	000056	.	Period, Decimal Point
47	027400	000057	/	Slash, Slant
48	030000	000060	0	
49	030400	000061	1	
50	031000	000062	2	
51	031400	000063	3	
52	032000	000064	4	
53	032400	000065	5	Digits, Numbers
54	033000	000066	6	
55	033400	000067	7	
56	034000	000070	8	
57	034400	000071	9	
58	035000	000072	:	Colon
59	035400	000073	:	Semicolon
60	036000	000074	<	Less Than
61	036400	000075	=	Equals
62	037000	000076	>	Greater Than
63	037400	000077	?	Question Mark

Decimal Value	Octal Values		Character	Meaning
	Left Byte	Right Byte		
64	040000	000100	@	Commercial At
65	040400	000101	A	
66	041000	000102	B	
67	041400	000103	C	
68	042000	000104	D	
69	042400	000105	E	
70	043000	000106	F	
71	043400	000107	G	
72	044000	000110	H	
73	044400	000111	I	
74	045000	000112	J	
75	045400	000113	K	
76	046000	000114	L	
77	046400	000115	M	
78	047000	000116	N	Upper Case Alphabet. Capital Letters
79	047400	000117	O	
80	050000	000120	P	
81	050400	000121	Q	
82	051000	000122	R	
83	051400	000123	S	
84	052000	000124	T	
85	052400	000125	U	
86	053000	000126	V	
87	053400	000127	W	
88	054000	000130	X	
89	054400	000131	Y	
90	055000	000132	Z	
91	055400	000133	[Left (opening) Bracket
92	056000	000134	\	Backslash, Reverse Slant
93	056400	000135]	Right (closing) Bracket
94	057000	000136	^ ↑	Caret, Circumflex: Up Arrow ⁴
95	057400	000137	— ←	Underline, Back Arrow ⁴

Decimal Value	Octal Values		Character	Meaning
	Left Byte	Right Byte		
96	060000	000140		Grave Accent ⁵
97	060400	000141	a	
98	061000	000142	b	
99	061400	000143	c	
100	062000	000144	d	
101	062400	000145	e	
102	063000	000146	f	
103	063400	000147	g	
104	064000	000150	h	
105	064400	000151	i	
106	065000	000152	j	
107	065400	000153	k	
108	066000	000154	l	
109	066400	000155	m	
110	067000	000156	n	
111	067400	000157	o	
112	070000	000160	p	
113	070400	000161	q	
114	071000	000162	r	
115	071400	000163	s	
116	072000	000164	t	
117	072400	000165	u	
118	073000	000166	v	
119	073400	000167	w	
120	074000	000170	x	
121	074400	000171	y	
122	075000	000172	z	
123	075400	000173	{	Left (opening) Brace ⁵
124	076000	000174	:	Vertical Line ⁵
125	076400	000175	}	Right (closing) Brace ⁵
126	077000	000176	~	Tilde, Overline ⁵

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Notes: ¹This is the standard display representation. The software and hardware in your system determine if the control code is displayed, executed, or ignored. Some devices display all control codes as "||", "@", or space

²Escape is the first character of a special control sequence. For example, ESC followed by "J" clears the display on a 2640 terminal.

³Delete may be displayed as "—", "@", or space

⁴Normally, the caret and underline are displayed. Some devices substitute the up arrow and back arrow

⁵Some devices upshift lower case letters and symbols (\ through ~) to the corresponding upper case character (@ through ^). For example, the left brace would be converted to a left bracket

RTE SPECIAL CHARACTERS

Mnemonic	Octal Value	Use
SOH (Control A)	1	Backspace (TTY)
EM (Control Y)	31	Backspace (2600)
BS (Control H)	10	Backspace (TTY, 2615, 2640, 2644, 2645)
EOT (Control D)	4	End-of-file (TTY 2615, 2640, 2644, 2645)

9206-1D

Appendix B

RTE-IVB Memory Organization

PHYSICAL MEMORY ORGANIZATION

Physical Memory in the RTE-IVB system is divided into areas for the system, memory resident programs, driver partitions, and a series of partitions used for execution of disc resident programs.

Physical memory is organized as shown in Figure B-1. The organization is fixed, although relative sizes of the areas depend on installation needs. Some areas (e.g., COMMON) will not exist in all systems. The user determines the driver partition size, the size of System Available Memory, the size of each disc resident partition, the size of COMMON, and the size and composition of the resident library and memory resident program area. The size of physical memory depends on the hardware supplied. RT4GN can configure a system from 48 to 1024 (decimal) pages long.

The various components in physical memory are described below.

SYSTEM BASE PAGE--The system base page contains the system communication area which is used by the system to define request parameters, I/O tables, scheduling lists, operating parameters, memory bounds, etc. System links, upper base page links (which include table area links, SSGA links, and driver links), and trap cells are also located on the system base page. For a description of links and how they are used, refer to Step 16b in Chapter 2.

TABLE AREA I--This area of memory includes the system Track Map Table, EQT's, Driver Map Table, Device Reference Table (DRT), Interrupt Table, some system entry points (refer to the RTE-IVB Programmer's Reference Manual), and all Type 15 modules. The unused space between the Table Area I modules and the start of the driver partition is allocated to SAM.

SYSTEM AVAILABLE MEMORY (SAM)--SAM is a designated area of memory set aside to satisfy temporary memory requirements. Reentrant subroutine ID tags, reentrant I/O, automatic buffering to I/O device, and many other system features require blocks of memory to be made available. Blocks of SAM are allocated as required by the system to satisfy these temporary needs. The amount of SAM required depends on specific applications. Subsystems (communications, spooling, etc.) may place additional requirements on this areas. For more information regarding SAM, refer to Chapter 2, Step 33. In physical memory, SAM exists in three blocks. The first block occupies the area from the end of Table Area I to the start of the next physical page. The other two blocks are described below.

RTE-IVB Memory Organization

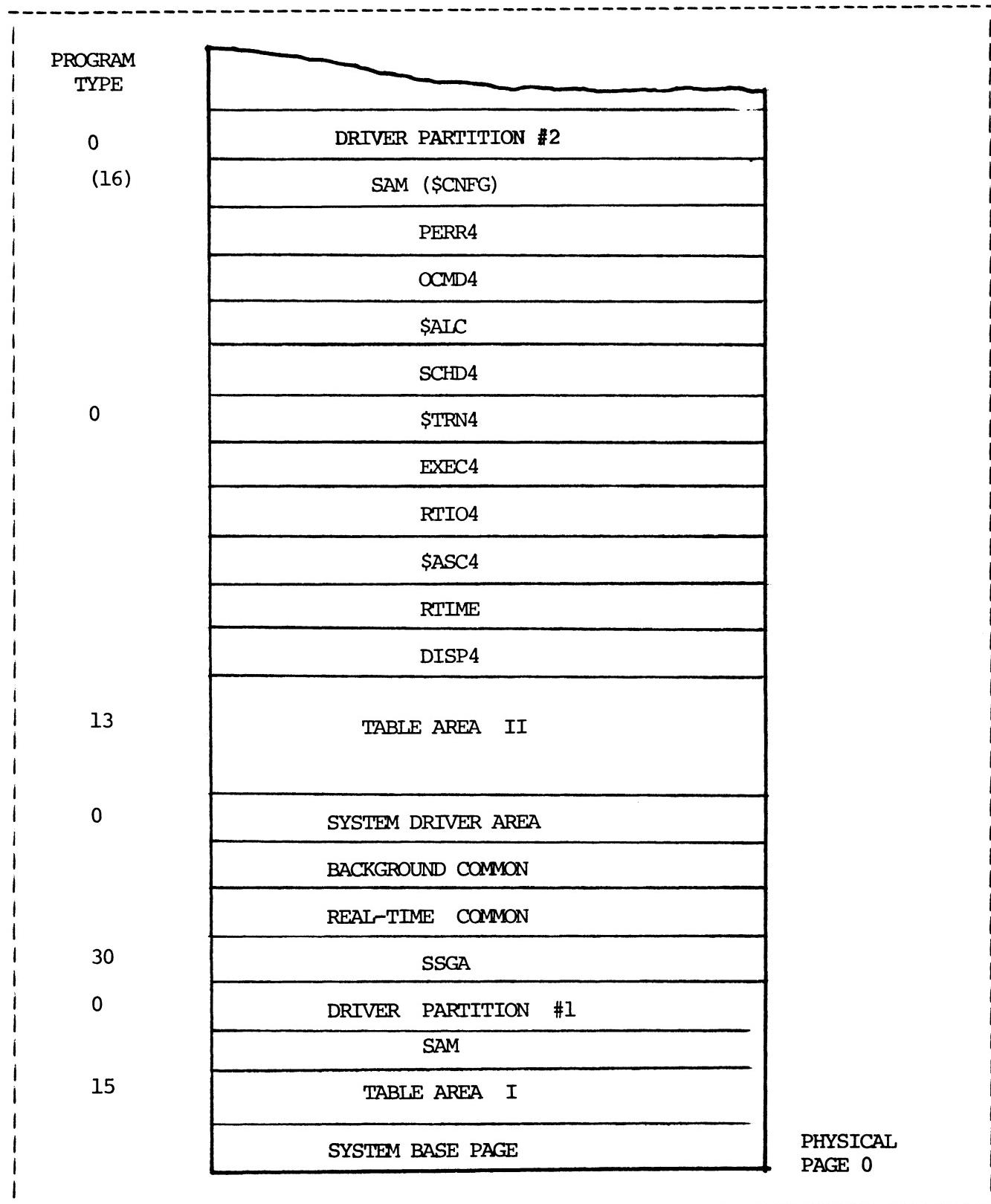


Figure B-1. RTE-IVB Physical Memory Configuration

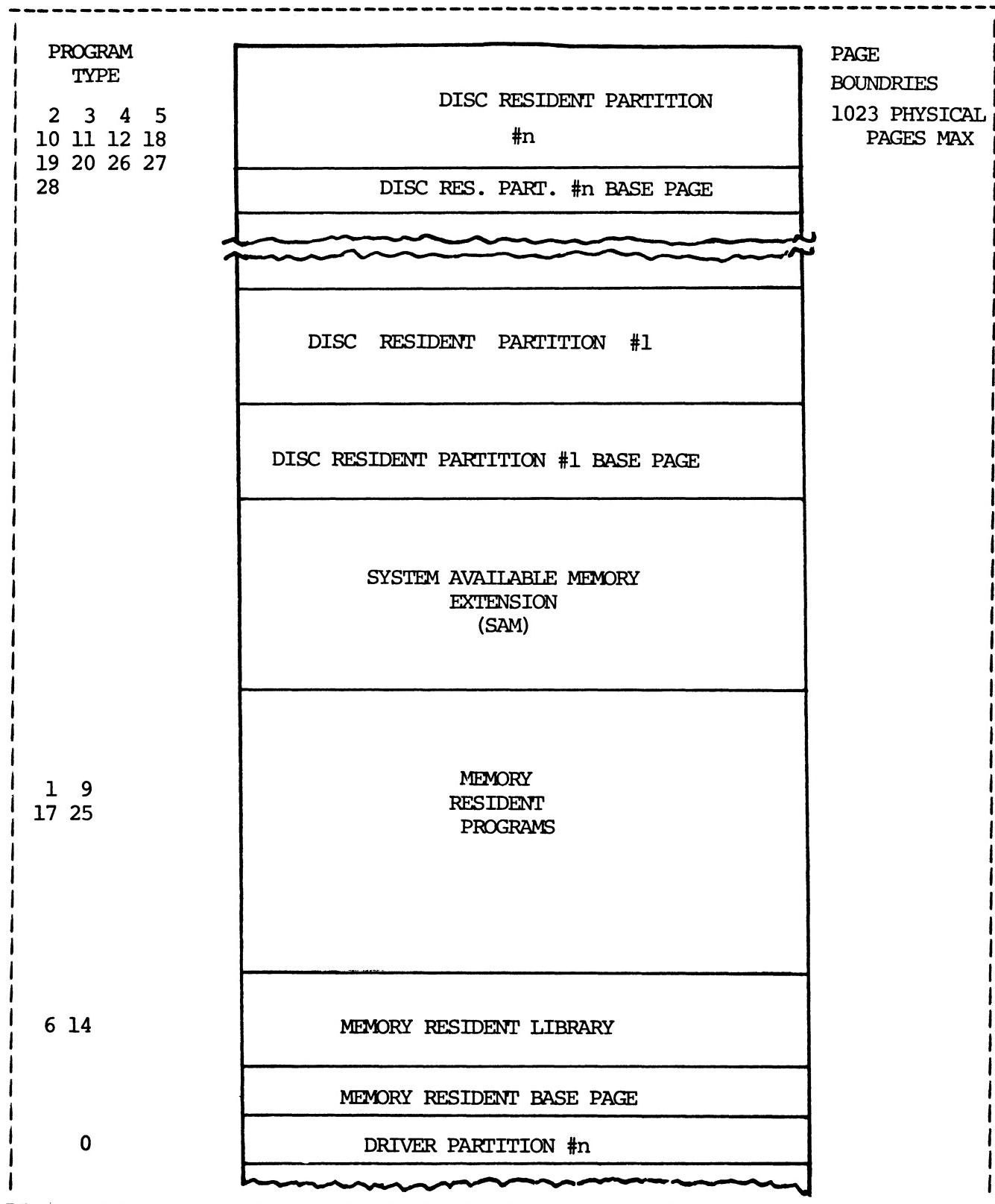


Figure B-1. RTE-IVB Physical Memory Configuration (Cont.).

RTE-IVB Memory Organization

DRIVER PARTITION #1---Driver partition #1 will always contain the driver for the system disc. It may also contain as many other drivers as will fit into the remaining space. The default driver partition size is two pages, which is large enough for all HP drivers. The default value may be changed during generation (refer to Chapter 2, Step 23).

SSGA---The Subsystem Global Area is used by HP subsystems to share common tables and programs. It contains modules accessed by their entry point rather than through common declarations. SSGA will contain all Type 30 modules loaded at generation time. Only those modules declaring SSGA (Types 17-20, 25-28) can access it.

REAL-TIME COMMON---The Real-Time COMMON area is used to share data between real-time, memory resident, and (optionally) background programs. The user has the option of increasing this amount during generation to accommodate future programs loaded on-line (see Step 23 in Chapter 2).

BACKGROUND COMMON---The background COMMON area is used to share data between background and (optionally) real-time and memory resident programs. The end of the background COMMON area is automatically extended to the next page boundary, making use of otherwise wasted space. The user has the option of adding additional memory (in page increments) to this area. Refer to Step 24, in Chapter 2.

CAUTION

Do not confuse the system COMMON areas described above with the local COMMON area which may be specified for a program loaded on-line. The local COMMON area precedes the program (i.e., it will be in the program's partition) and is accessible only to that program, its subroutines, and its segments. Any programs that you want to use local COMMON cannot be relocated by the generator.

SYSTEM DRIVER AREA---The System Driver Area (SDA) contains all non-partition resident drivers. This category typically includes privileged drivers, very large drivers, or drivers that do their own mapping.

TABLE AREA II---Table Area II contains system tables, some system entry points and all type 13 modules. The following system tables are included in Table Area II: class table, batch LU switch table, resource number table, long ID segments, short ID segments, ID extensions, partition definition table, and track allocation table. The sizes of these tables are primarily determined from the responses given during the relocation and system loading phases (refer to Steps 16 and 17 in Chapter 2).

OPERATING SYSTEM---This area contains all the type 0 operating system modules. The operating system is composed of the following components:

DISP4 This component dispatches programs for execution. Program execution is controlled according to the scheduled list (maintained by SCHED). DISP4 will determine the partition in which the program will execute, and if necessary, initiate disc swapping. Other functions performed by DISP4 are to set up the user map and memory protect fence before program execution, set up the partition list (\$MATA) at initialization, and to coordinate the clean up of system resources when programs are aborted.

RTIME RTIME is a real time clock processor that handles all time dependent functions. The major functions performed by RTIME are:

- * Increment real time clock values every 10 milliseconds.
- * Schedule programs on the time list.
- * Add programs to the time list.
- * Retrieve current system time for EXEC 11 requests.
- * Start TBG at initialization or after a power fail.
- * Process device time outs.
- * Process batch time outs.

\$ASC4 The \$ASC4 module contains system ASCII message strings.

RTIOC4 The RTIOC4 module controls all system peripheral input and output operations. It routes I/O interrupts to the appropriate drivers and system processors. I/O requests are made to RTIOC either by EXEC calls from user programs or by system I/O calls from other parts of the operating system. RTIOC4 also sets up the maps and base page communication area before calling drivers.

EXEC4 EXEC4 is the system module that interfaces user program requests to the Operating System. Specific functions performed by EXEC are:

- * Provides for general checking and examination of EXEC call requests and calls the appropriate processing routine. Provides memory protect violation control.
- * Processes privileged and reentrant subroutines.
- * Manages disc track allocation and release.
- * Handles general error messages and program abort.

RTE-IVB Memory Organization

\$TRN4 \$TRN4 is the system resource number (RN) deallocation routine. It is called by the dispatcher (DISP4) whenever a program completes. Its function is to release any local locks and any local RN allocations the program has. It also releases any LU locks the program has.

SCHD4 SCHD4 handles program state transitions, responds to operator input commands, initiates system start-up at bootup, and satisfies or passes to other processors eleven EXEC calls (6 through 12, 14, and 22 through 24).

\$ALC The \$ALC module allocates blocks of SAM to the processors requesting temporary memory. The \$RTN routine (within \$ALC) returns memory no longer needed to SAM.

OCMD4 This module provides execution of the following system commands:

LU,P1[,P2[,P3]]	LU status and LU change
EQ,P1[,P2]	EQT status and buffering change
TO,P1[,P2]	Show timeout or change timeout

PERR4 This is a parity error module that reports parity errors detected by the hardware and continues operation of the system if possible. PERR4 tries to reproduce parity errors to detect hardware errors. If hardware errors are detected, PERR4 brings down the partition in which the error was generated.

SYSTEM AVAILABLE MEMORY (\$CNFG)--This is the second block of SAM which starts immediately after the system and is approximately 2.5 pages in size. During boot-up and reconfiguration, this area is occupied by the RTE reconfiguration module \$CNFG.

DRIVER PARTITIONS #2 THROUGH #N--The number of driver partitions depends on the size and number of drivers relocated as partition resident. The default driver partition size is two pages, which is large enough for all HP drivers. The generator attempts to fit as many drivers as will fit into a driver partition before allocating space for additional partitions.

MEMORY RESIDENT BASE PAGE--The memory resident base page contains all memory resident program links, all memory resident library links, upper base page links, and the system communications area.

MEMORY RESIDENT LIBRARY--The memory resident library contains common subroutines that may be accessed by more than one memory resident program. Placing a subprogram (or subroutine) in this area means that it will not be appended to memory resident programs that call it. However, it is subject to special design constraints so that two programs will not inadvertently gain concurrent access. Only memory resident programs can access routines in the memory resident library.

MEMORY RESIDENT PROGRAM AREA---This is the area in memory where programs are always resident (i.e., they are not swapped out to the disc). It is intended for high priority tasks that require quick response time to real-time conditions and that cannot afford disc load time, and for small programs that are used frequently.

SYSTEM AVAILABLE MEMORY EXTENSION---This is the third block of SAM in physical memory. The SAM extension is optional, with its size specified by increasing, in page increments, the page number where the disc resident partitions start.

PROGRAM PARTITIONS---The number of pages remaining after the SAM extension must be divided into program partitions (maximum of 64). Each partition must be at least two pages long -- one page to be used as a base page and the remainder for the program. The number and size of partitions are specified during generation. The partition definitions may be later changed by the use of the reconfigurator. Each disc resident base page contains the system communication area, upper base page links, and that disc resident program's links (see Step 16a in Chapter 2).

LOGICAL MEMORY ORGANIZATION

In order to better understand the concept of logical memory, you should be familiar with the description of the dynamic mapping system given in the 21MX Computer Series Reference Manual.

Logical Memory is the 32K word (maximum) address space described by the currently enabled memory map. A memory map can be defined as 32 hardware registers that provide the interface between physical memory and the 32K word logical memory. The four memory maps (System, User, Port A, and Port B) provide the capability of addressing memory configurations of more than 32K words. Note that all memory map addressing is done internally by the system and is transparent to the user. The four possible logical map configurations is shown in Figure B-2. A discussion of these configurations follows:

SYSTEM MAP---Figure B-3 shows a sample system logical map configuration. Note that while SAM exists in three areas in physical memory, in logical memory SAM exists in two blocks. The first block follows the list Table Area I modules, and the second block starts immediately after the system. The second block will include the area occupied by the reconfiguration module at bootup and the SAM extension.

NOTE

The driver partition included in the system and user logical maps will vary. The system will map a driver partition into the system map whenever a driver needs access to a buffer in

RTE-IVB Memory Organization

the system area (i.e., SAM). Driver partitions are mapped into the user address space whenever a driver needs access to a buffer inside a programs partition.

MEMORY RESIDENT MAP--Figure B-4 shows the logical map configuration for the memory resident program area. The System Driver Area and Table Area II will be included in this map if so specified at generation (see Step 11 in Chapter 2).

REAL TIME AND BACKGROUND MAP--A sample map for a RT or BG program (Type 2 and 3) is illustrated in Figure B-5 . The System Driver Area; Table Area II , and System COMMON Area, are always included in this map.

LARGE BACKGROUND PROGRAM MAP--Figure B-6 illustrates a sample large background (Type 4) program map. Note that the System Driver Area and Table Area II are not included in this map, thus potentially allowing for more program space. The system COMMON area will be included only in the maps of those large background programs that access it.

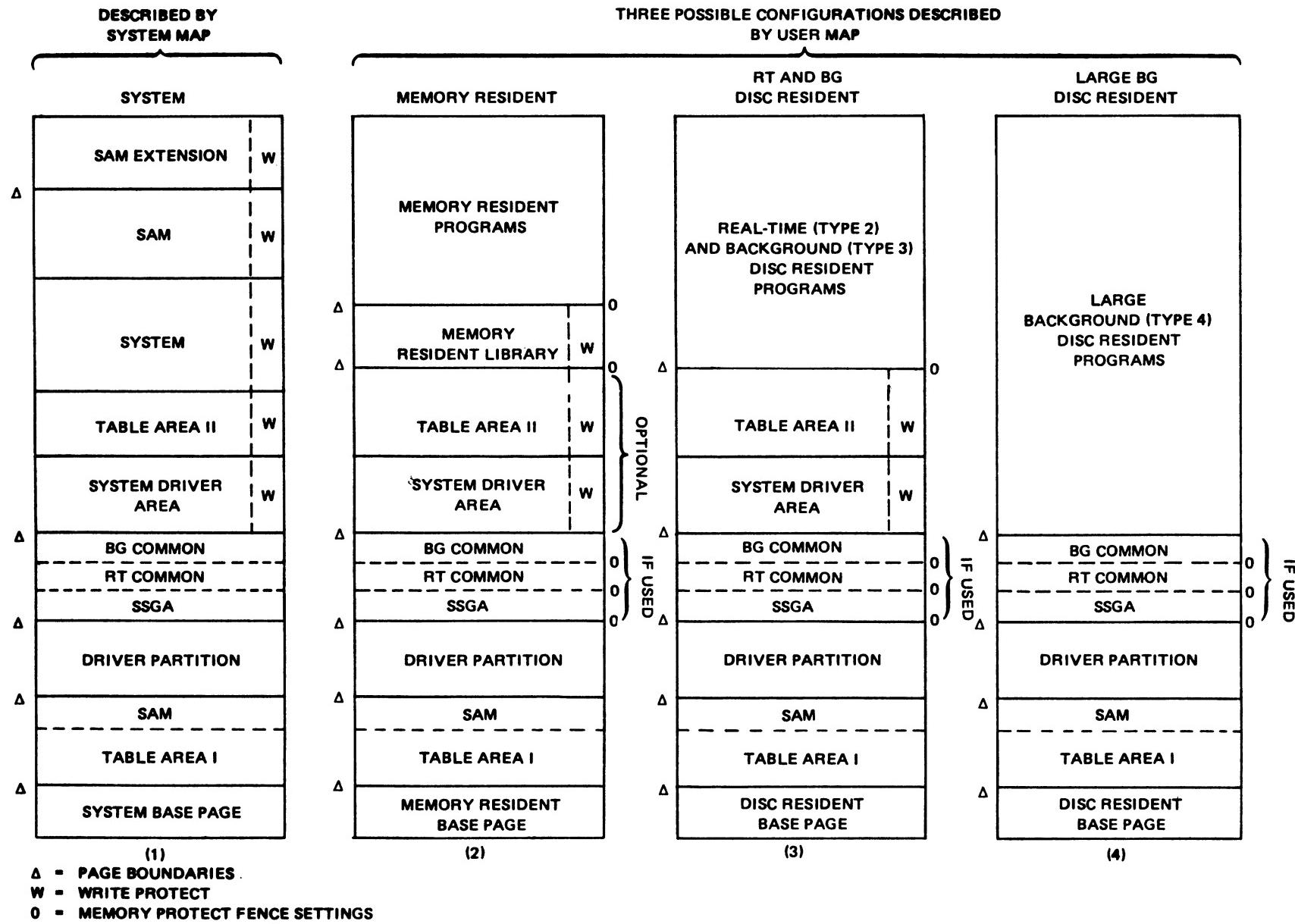


Figure B-2. RTE-IVB 32K Logical Memory Configurations

RTE-IVB Memory Organization

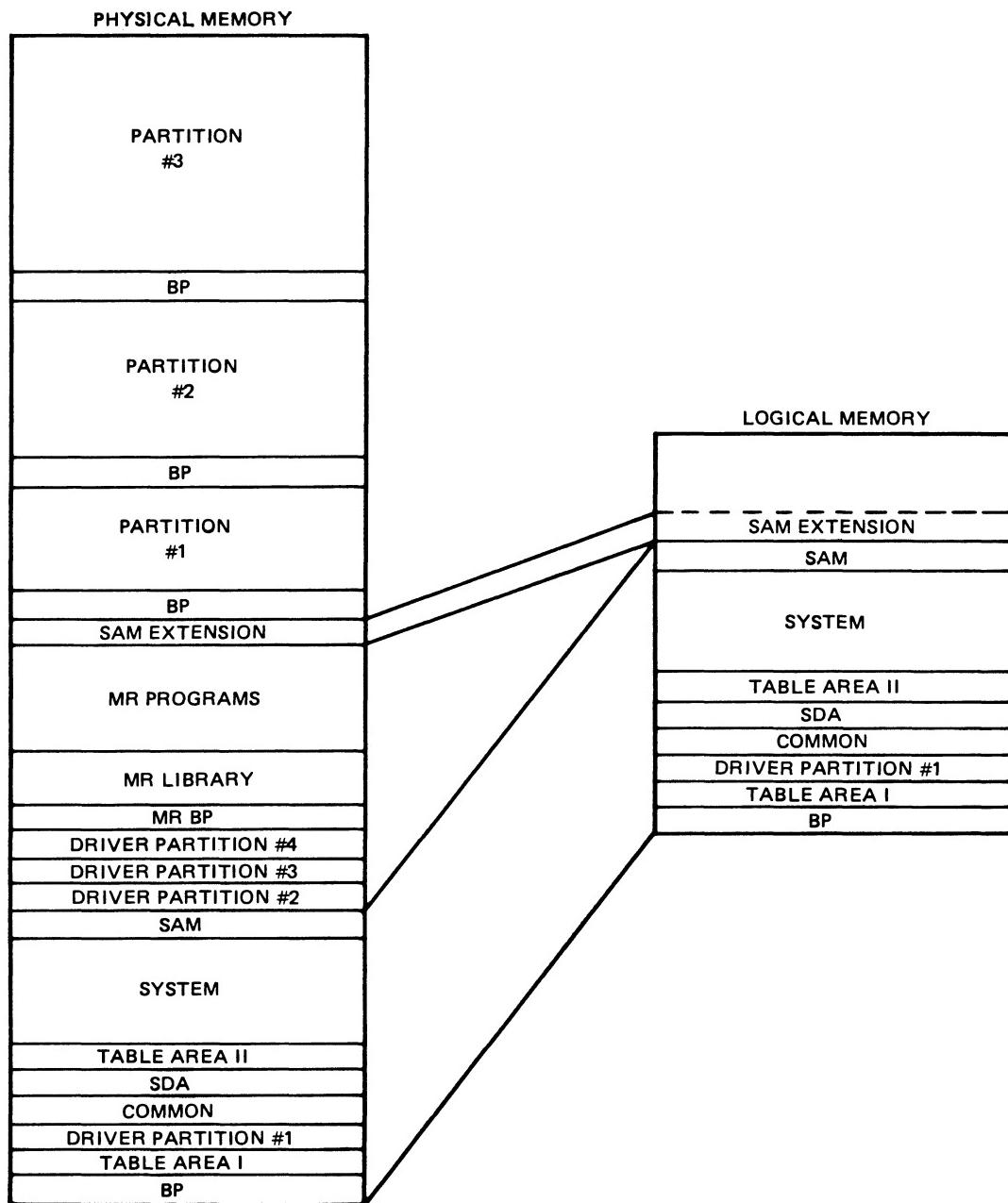


Figure B-3. Sample System Map

MEMORY RESIDENT PROGRAM WITH COMMON AND TABLE AREA II

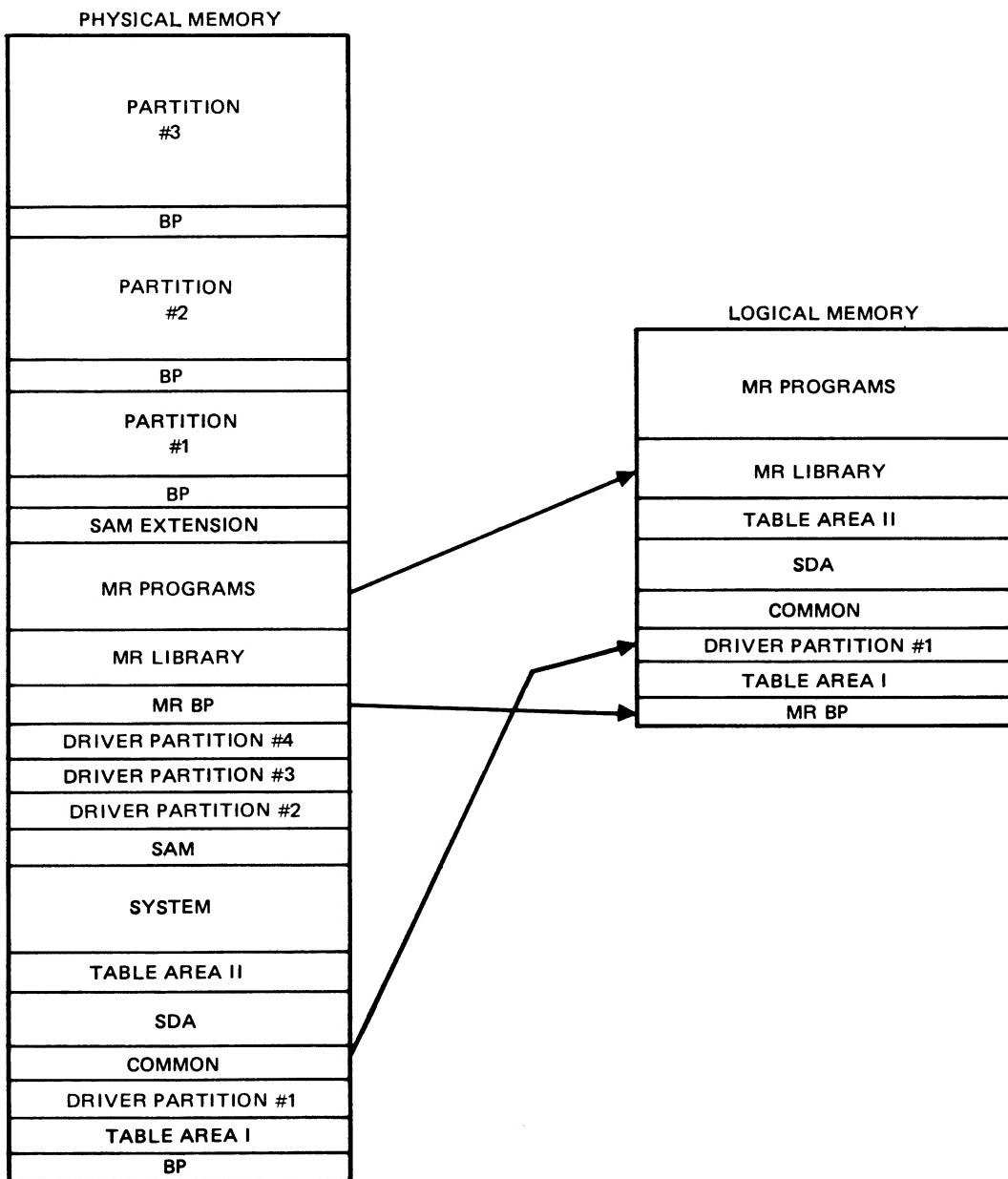


Figure B-4. Sample User Map (Mem Res Program With Common)

**DISC RESIDENT PROGRAM WITH OR WITHOUT COMMON
(TYPE 2 OR 3)**

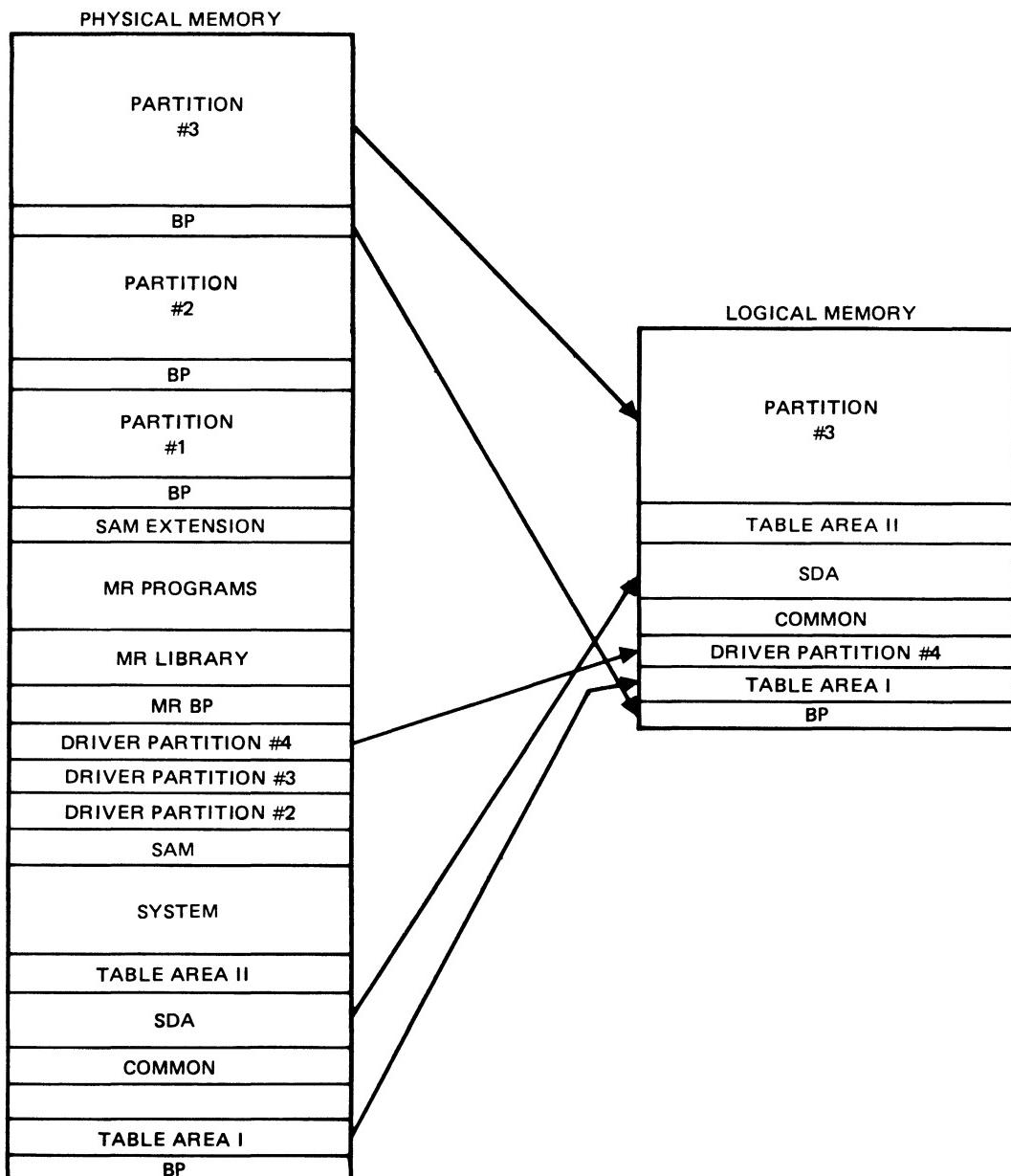


Figure B-5. Sample User Map (Disc Resident Program)

**LARGE BG DISC RESIDENT PROGRAM WITH COMMON
(TYPE 4)**

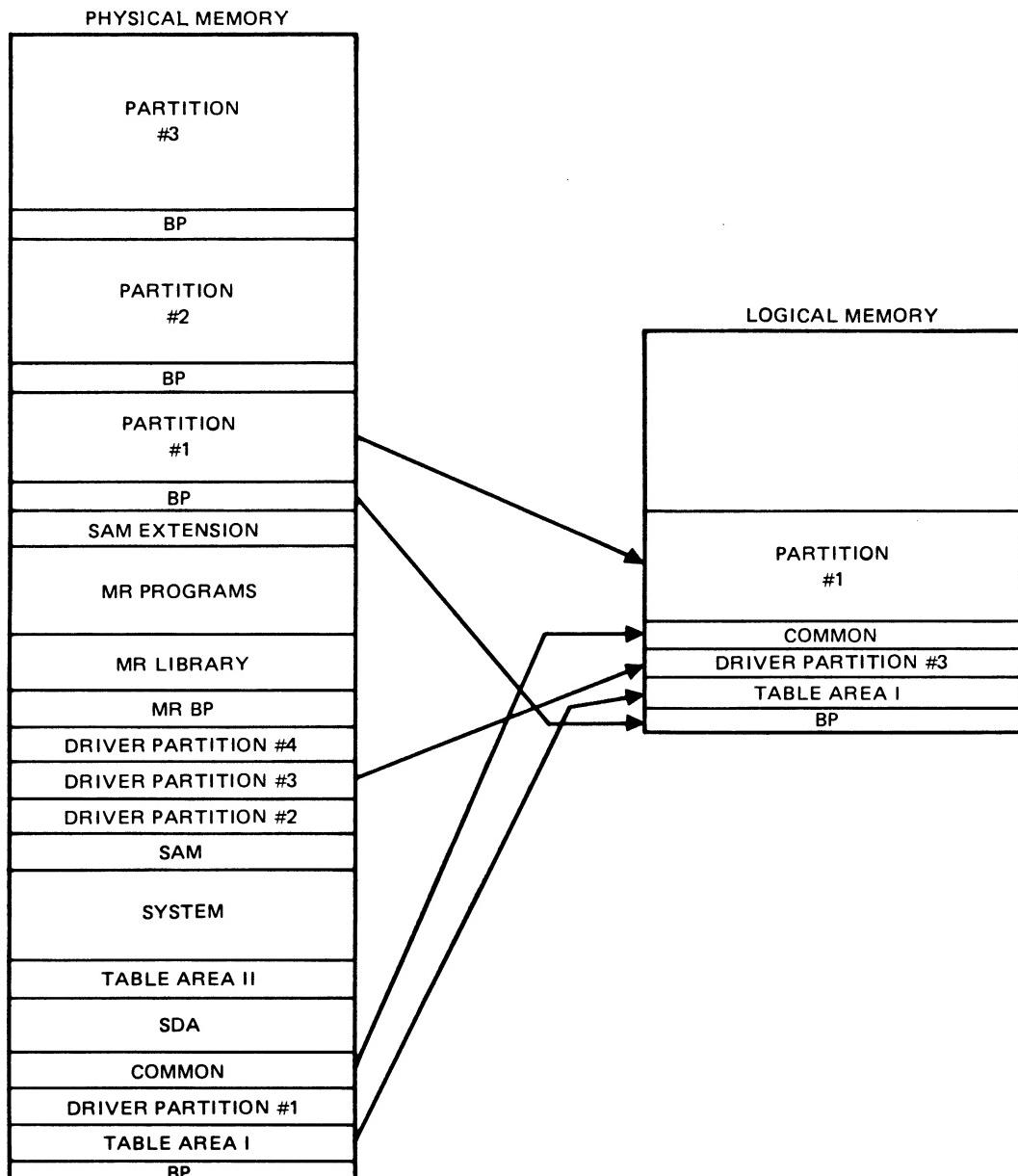


Figure B-6. Sample User Map (BG Disc Res Program With Common)

BASE PAGE MAPPING AND ORGANIZATION

The base page fence (refer to the 21MX Computer Series Reference Manual) is automatically set by RTE-IV for all user base pages so that the top portion of the base page will contain the system communication area and upper base page links, and the bottom portion will contain the user program's links. The DMS hardware will map base page references above the fence to the system base page and map reference below the fence to the particular user base page operating at the time. (This mapping has no effect when the System Map is enabled.)

Figure B-7 illustrates the logical base page configuration of the system, memory resident programs, and disc resident programs.

Figure B-8 illustrates the base page mapping scheme for a partition resident program.

The upper base page linkage area and system communication areas are available to all programs for read only access. The size of the system communication area is fixed. The size of upper and lower base page linkage areas will vary with the number of program page crossings, which may cause indirect links to be generated on the base page. The LINKS IN CURRENT command (see Step 16b in Chapter 2) can be specified to reduce the number of base page links used during program relocation. The user has no direct control over the allocation of the base page area. Linkages are allocated as needed during generation. As an aid in generation, RT4GN will optionally trace the allocation of links, program by program, via the MAP LINKS command.

MEMORY PROTECTION

Memory protection between disc resident program partitions and between disc and memory resident programs is provided by the dynamic mapping system. A program cannot access a user page that is not included (either directly or through a DCPC transfer) in its logical memory. Since many programs will not use all of the possible 32K logical area, unused logical pages above the program are read/write protected. It is possible for a user to read from system logical memory via cross-map loads, but the system is write protected.

A different form of protection is required for the driver partition and for Table Area I since these areas exist in the user's addressing space. The memory protect fence provides this protection by preventing stores and jumps to locations below a specified address. All possible fence positions are shown in Figure B-9.

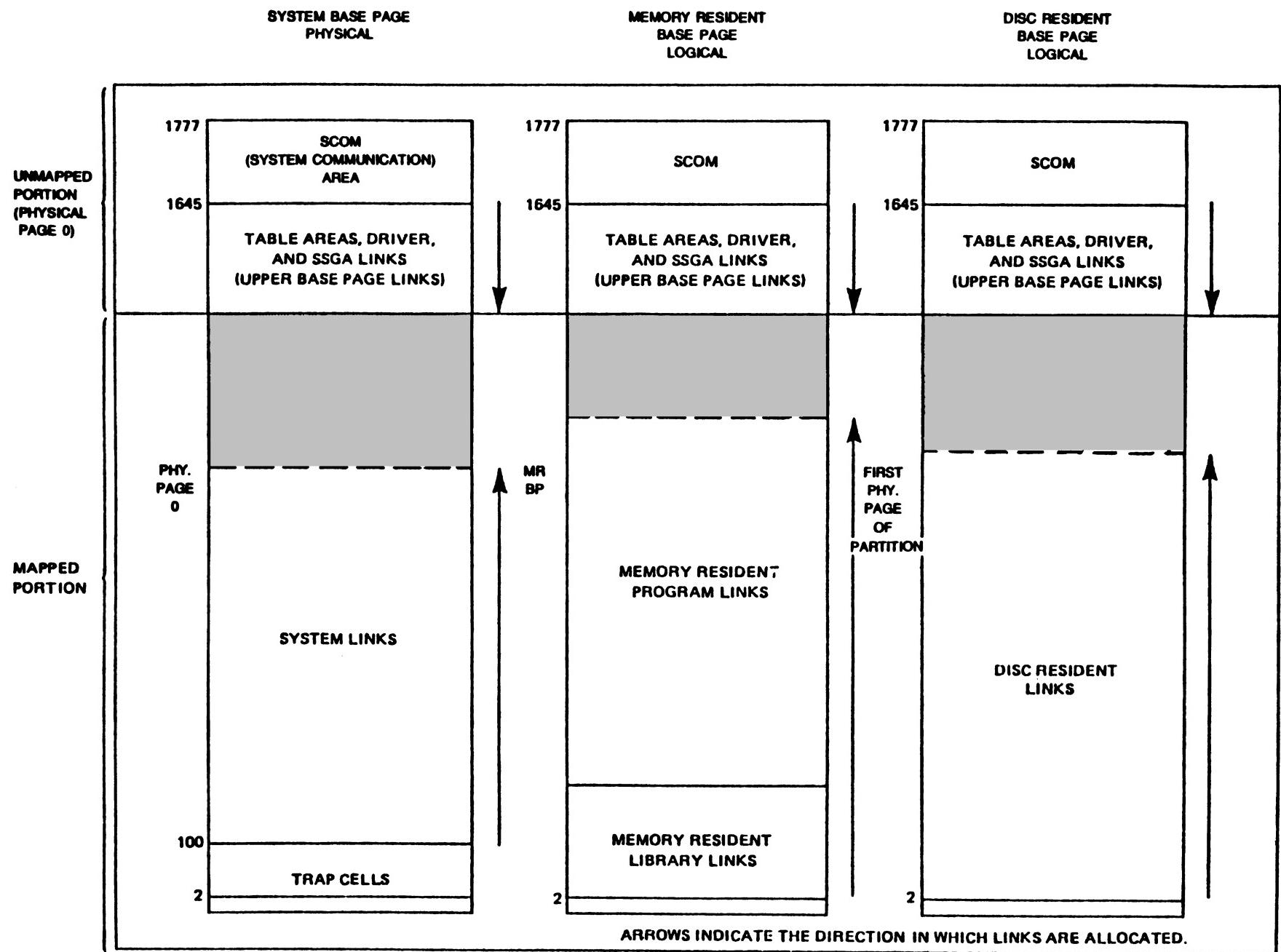


Figure B-7. System Base Pages

USER LOGICAL BASE PAGE

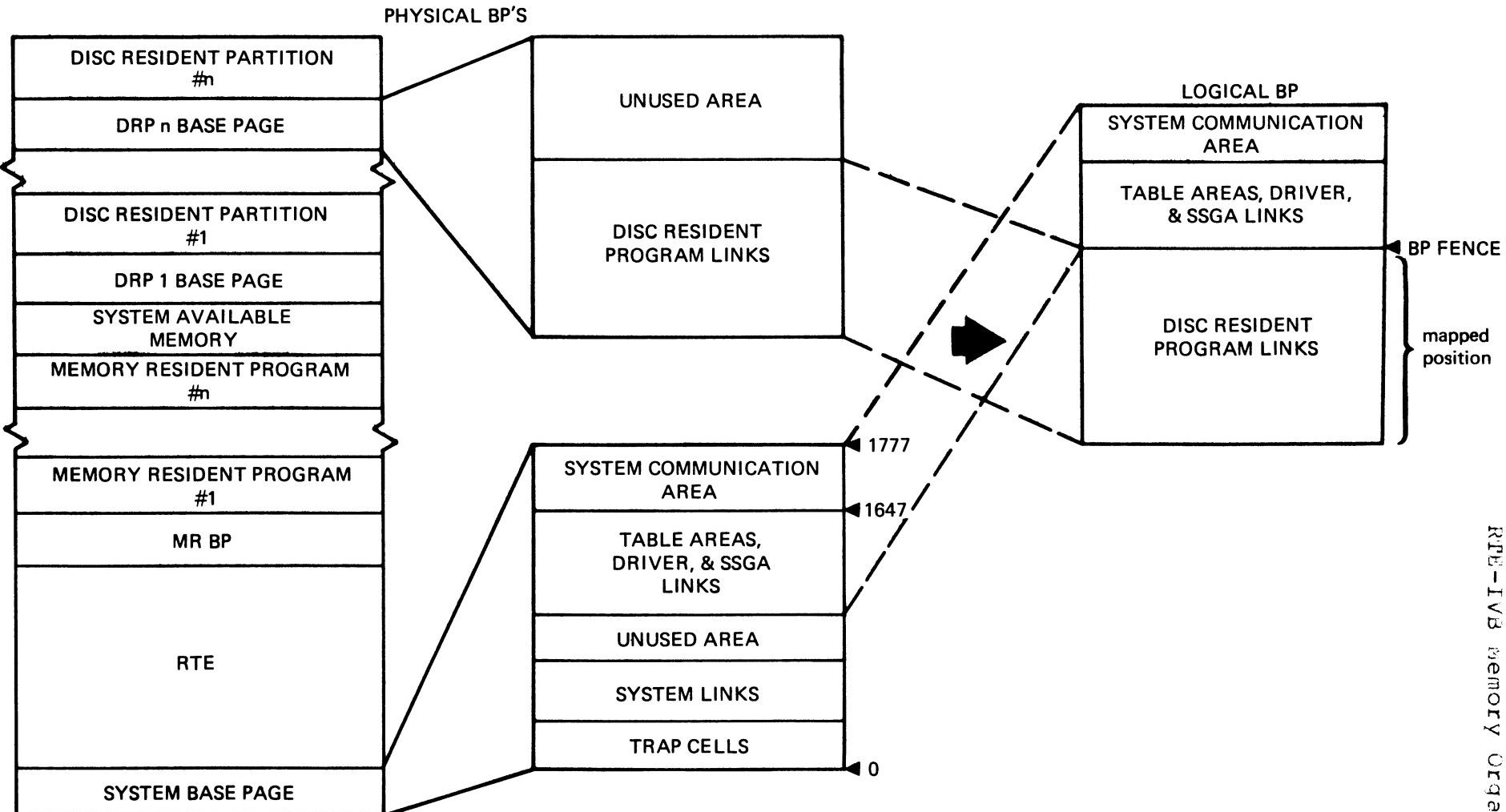


Figure B-8. User Logical Base Page

The memory protect fence applies to the logical address space, and addresses are compared to the fence before translation. If a disc resident program does not use any of the COMMON areas, the memory protect fence is set at the bottom of the program area. For a memory resident program not using COMMON, the memory protect fence is set above the memory resident library area until a memory resident library routine is executed, in which case the memory protect fence setting is placed below the memory resident library area.

For programs using COMMON, all of COMMON is mapped and the fence is set at one of three possible locations, depending on the portion of COMMON being used. Figure B-9 expands the COMMON area and shows the three fence settings: A, B, and C.

GENERATOR RELOCATION GUIDELINES

The following paragraphs describe the generator procedures when relocating various system components.

TABLE AREA I MODULES - These are Type 15 modules loaded into Table Area I, in addition to some entry points and the system I/O tables stored there by the generator. Table Area I is loaded sequentially above the system base page. Base page links are allocated downward below the system communication area and are included in the system and all user base pages.

PARTITION RESIDENT DRIVERS - These are Type 0 modules whose EQT entries did not include the "S" or "M" options specifying System Driver Area. The starting relocation address of the first driver in each partition is word 0 of the logical page following Table Area I. Driver partition #1 is required to have the system disc driver in it

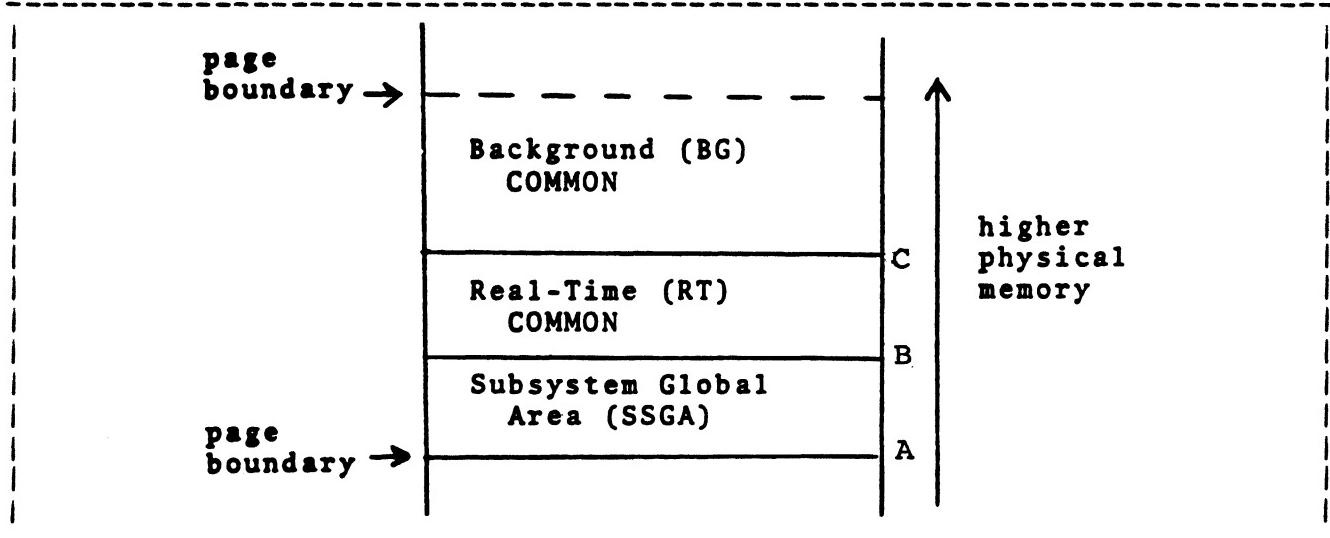


Figure B-9. Memory Protect Fence Locations For Programs.

RTE-IVB Memory Organization

for reconfiguration purposes. Base page links are allocated downward below the Table Area links and are included in all system and user base pages.

The generator attempts to optimize the relocation of drivers into driver partitions. After the first driver is relocated into a partition, a scan is made of the module symbol table, searching for the next unrelocated partition-resident driver that is small enough to fit into the remainder of that partition. The scan starts at the beginning of the table, and the first driver that fits will be relocated. The process is repeated after the relocation of each driver until no drivers are found that are small enough to be relocated into the remaining driver partition space. Should a driver overflow the partition (because of subroutines appended during relocation), backup will be done over that driver. The generator scans to see if there are any other drivers left that will fit, and the above process is repeated. The driver causing the overflow will be re-relocated into a subsequent driver partition.

SUBSYSTEM GLOBAL AREA (SSGA) - These are Type 30 modules loaded sequentially into COMMON. The starting address of COMMON (& SSGA) is word 0 of the logical page following the driver partition. Base page links are allocated downward below the driver partition #1 links and are included in all system and user base pages.

SYSTEM DRIVER AREA (SDA) - These are Type 0 modules whose EQT entries specified the "S" or "M" option. The starting address of SDA is word 0 of the logical page following COMMON (if any). Base page links are allocated downward below the SSGA links and are included in the system and all user base pages.

TABLE AREA II MODULES - These are Type 13 modules loaded into Table Area II, in addition to some entry points and the system tables built by the generator. Table Area II is loaded sequentially above the System Driver Area. Base page links are allocated downward below the SDA links and are included in the system and all user base pages.

SYSTEM MODULES - These are all remaining Type 0 modules (EXEC, RTIOC, SCHED, etc.) and are loaded sequentially above Table Area II. Base page links for these modules are allocated upward from location 100 in the system base page toward the Table Area, SSGA, and driver links.

The reconfiguration module is loaded sequentially after the Type 0 system modules. The memory area occupied by this module will become part of System Available Memory after the reconfiguration has been completed. Base page links for this module follow the system links in the system base page.

MEMORY RESIDENT LIBRARY MODULES - These are Type 6 and 14 modules (reentrant, privileged, and force-loaded) for use by memory resident programs only. If memory resident programs requested Table Area II access, then the library area is loaded sequentially starting at word 0 of the logical page following Table Area II. Otherwise the library is loaded sequentially at word 0 of the logical page at or following COMMON. Base page links for library modules are allocated upward in the memory resident base page, starting at location 2.

MEMORY RESIDENT PROGRAMS - These programs are loaded sequentially starting at the first logical page following the resident library. The first two words of each memory resident program area are reserved to save index registers in the event that the program is interrupted. Base page links for these programs are allocated upward in the memory resident base page above the library links. The highest available link address is the word before the lowest driver link in the upper BF links area.

DISC RESIDENT PROGRAMS - These RT and BG programs are relocated into logical memory and stored on the disc. Each program starts at word 34 of the logical page following Table Area II. The first two words of the page are reserved to save index registers in the event that the program is interrupted; the next 32 words save the DMS map registers in case of a program swap. Both RT and BG programs can be segmented. Base page links are allocated upward from location 2 of the user base page. The highest available link address is the word before the lowest driver link. These links are written on the disc and are referred to as the user base page. This user base page is swapped with the program into memory and placed into the first page of the selected partition.

All real-time and Type 3 background programs have the memory area occupied by Table Area I through Table Area II included in their logical address space.

Note that references to system entry points defined in Type 0 modules will be allowed for only Type 3 background programs (for use by HP subsystem modules).

TYPE 4 BACKGROUND DISC RESIDENT PROGRAMS WITHOUT COMMON - These background programs have Table Area I and the driver partition included in their logical address space. Each program starts at word 34 of the logical page following the driver partition. Otherwise these programs are treated the same as other disc resident programs.

TYPE 4 BACKGROUND DISC RESIDENT PROGRAMS WITH COMMON - These programs are treated the same as the disc resident programs without COMMON. The only difference is that the program starts at word 34 of the logical page following the COMMON area.

Appendix C

RTE-IV System Disc Layout

DISC LAYOUT OF AN RTE-IV SYSTEM

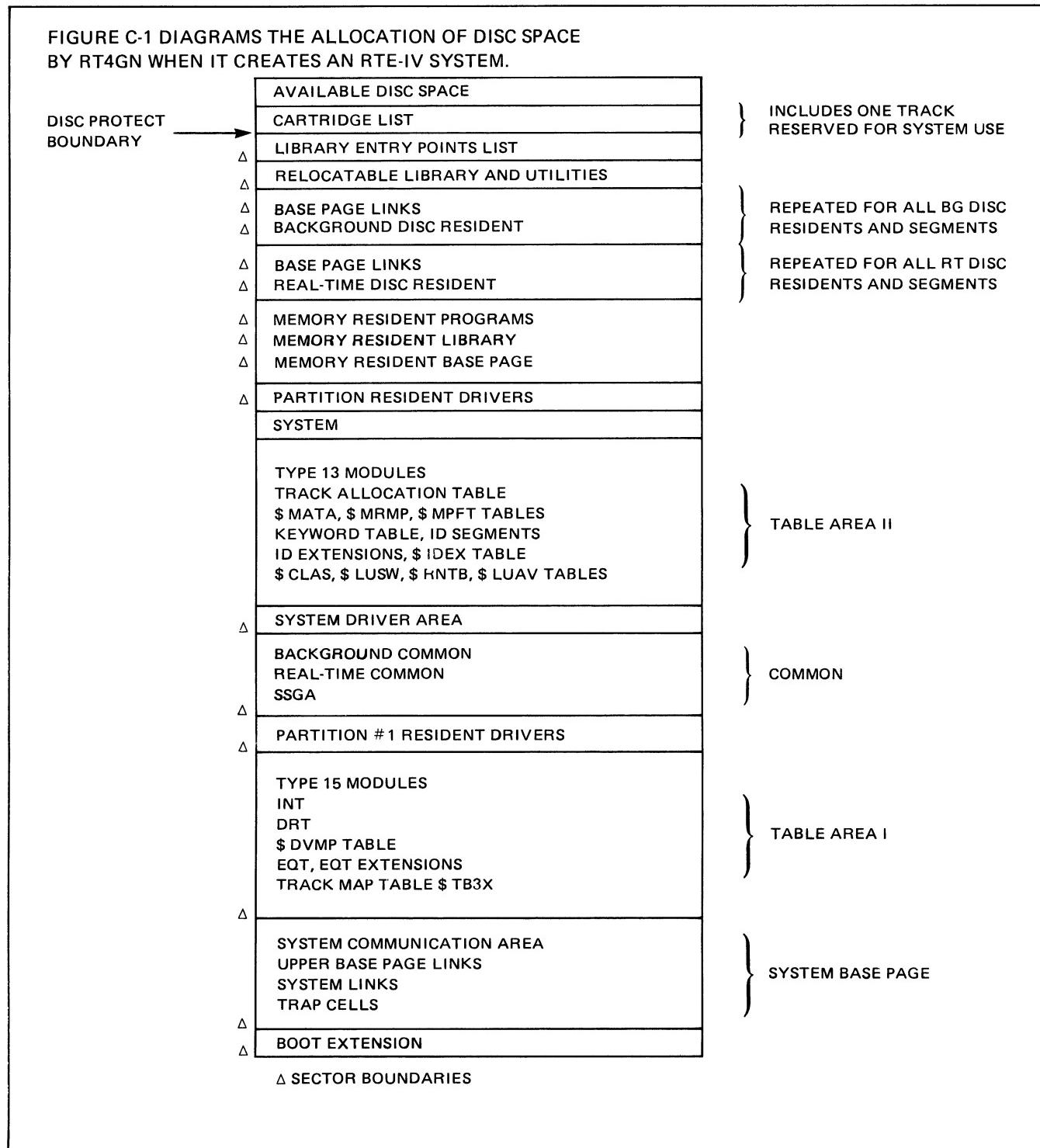


Figure C-1. RTE-IV SYSTEM DISC LAYOUT

Appendix D

Generation Worksheet Forms

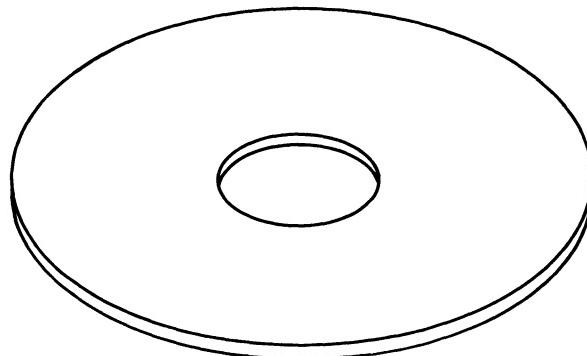
The following pages contain the blank generation worksheet forms. In the lower right corner of these blank worksheets you will find the figure number of the corresponding sample worksheets that are located throughout the manual.

It is recommended that all of the worksheets that are included (in their appropriate order) in this appendix be duplicated. The copies then can be used for planning the system, and the blank original worksheets can be left in the manual for future use.

HP 7900 DISC WORKSHEET

SUBCHANNEL 1

REMOVABLE

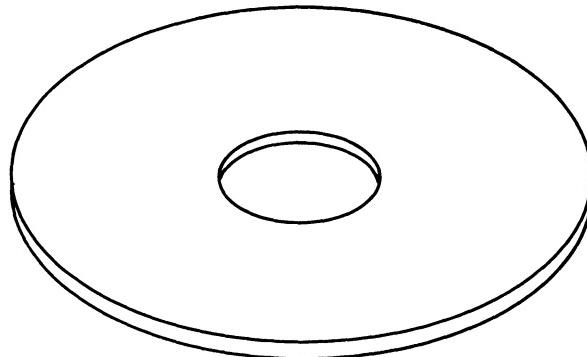


NO. OF TRACKS AVAILABLE _____

FIRST TRACK _____

SUBCHANNEL 0

FIXED



NO. OF TRACKS AVAILABLE _____

FIRST TRACK _____

SYSTEM SUBCHANNEL NUMBER _____ (LOGICAL UNIT 2)

AUXILIARY SUBCHANNEL NUMBER _____ (LOGICAL UNIT 3)

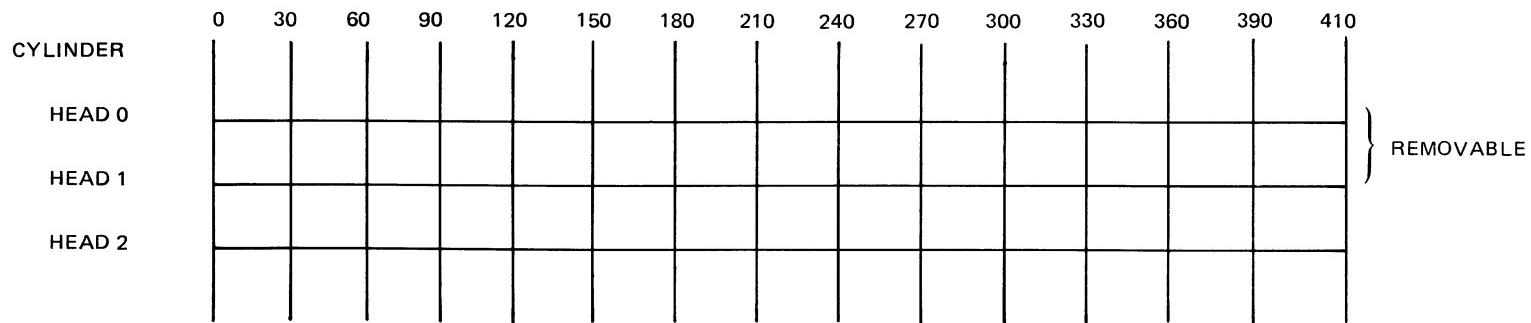
HP 7905 DISC WORKSHEET

STEP 1

FILL IN UNIT NUMBER: _____

STEP 2

TRACKS ARE SHOWN END-TO-END ON THREE SURFACES. USE PENCIL TO CIRCLE YOUR SUBCHANNELS. WITHIN EACH CIRCLE WRITE THE FOLLOWING INFORMATION: THE SUBCHANNEL NUMBER; THE NUMBERS OF THE STARTING AND ENDING CYLINDERS; THE TOTAL NUMBER OF TRACKS, EXCLUDING SPARES; THE NUMBER OF SPARE TRACKS; AND THE LOGICAL UNIT NUMBER FOR EACH SUBCHANNEL.



STEP 3

TRANSLATE **STEP 2** TO NUMBERS:

SUBCHANNEL	# OF TRACKS, EXCLUDING SPARES	STARTING CYLINDER	STARTING HEAD	TOTAL # OF SURFACES INCLUDED IN SUBCHANNEL	NUMBER OF SPARES	SYSTEM? (<input checked="" type="checkbox"/>)	AUXILIARY? (<input checked="" type="checkbox"/>)

HP 7906(H) DISC WORKSHEET

STEP 1

FILL IN UNIT/ADDRESS NUMBER: _____

STEP 2

TRACKS ARE SHOWN END-TO-END ON FOUR SURFACES. USE PENCIL TO CIRCLE YOUR SUBCHANNELS. WITHIN EACH CIRCLE WRITE THE FOLLOWING INFORMATION: THE SUBCHANNEL NUMBER; THE NUMBERS OF THE STARTING AND ENDING CYLINDERS; THE TOTAL NUMBER OF TRACKS, EXCLUDING SPARES; THE NUMBER OF SPARE TRACKS; AND THE LOGICAL UNIT NUMBER FOR EACH SUBCHANNEL.

The diagram illustrates a disk platter with 14 cylinders, labeled from 0 to 410 in increments of 30. There are four heads, labeled HEAD 0 through HEAD 3. The heads are positioned such that each head spans all 14 cylinders. The tracks within each cylinder are represented by vertical lines. The first track in each cylinder is aligned with the outer edge of the platter, while the last track is aligned with the inner edge.

} REMOVABLE

STEP 3

TRANSLATE **STEP 2** TO NUMBERS:

HP 7920(H) DISC WORKSHEET

STEP 1

FILL IN UNIT/ADDRESS NUMBER: _____

STEP 2

TRACKS ARE SHOWN END-TO-END ON FIVE SURFACES. USE PENCIL TO CIRCLE YOUR SUB-CHANNLES. WITHIN EACH CIRCLE WRITE THE FOLLOWING INFORMATION: THE SUBCHANNEL NUMBER; THE NUMBERS OF THE STARTING AND ENDING CYLINDERS; THE TOTAL NUMBER OF TRACKS, EXCLUDING SPARES; THE NUMBER OF SPARE TRACKS; THE LOGICAL UNIT NUMBER FOR EACH SUBCHANNEL.

CYLINDER	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	822
HEAD 0																		
HEAD 1																		
HEAD 2																		
HEAD 3																		
HEAD 4																		

ALL ARE REMOVABLE

HP 7920 DISC WORKSHEET (Cont.)

STEP 3 TRANSLATE **STEP 2** TO NUMBERS:

HP 7925(H) DISC WORKSHEET

STEP 1

FILL IN UNIT/ADDRESS NUMBER: _____

STEP 2

TRACKS ARE SHOWN END-TO-END ON NINE SURFACES. USE PENCIL TO CIRCLE YOUR SUB-CHANNELS. WITHIN EACH CIRCLE WRITE THE FOLLOWING INFORMATION: THE SUB-CHANNEL NUMBER; THE NUMBERS OF THE STARTING AND ENDING CYLINDERS; THE TOTAL NUMBER OF TRACKS, EXCLUDING SPARES; THE NUMBER OF SPARE TRACKS; THE LOGICAL UNIT NUMBER FOR EACH SUBCHANNEL.

CYLINDER	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	822
HEAD 0																		
HEAD 1																		
HEAD 2																		
HEAD 3																		
HEAD 4																		
HEAD 5																		
HEAD 6																		
HEAD 7																		
HEAD 8																		

HP 7925 DISC WORKSHEET (Cont.)

STEP 3 TRANSLATE **STEP 2** TO NUMBERS:

SUBCHANNEL	# OF TRACKS, EXCLUDING SPARES	STARTING CYLINDER	STARTING HEAD	TOTAL #OF SURFACES INCLUDED IN SUBCHANNEL	NUMBER OF SPARES	SYSTEM? ()	AUXILIARY? ()
0							
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							

HP 7925 DISC WORKSHEET (Cont.)

STEP 3 TRANSLATE **STEP 2** TO NUMBERS:

SUBCHANNEL	# OF TRACKS, EXCLUDING SPARES	STARTING CYLINDER	STARTING HEAD	TOTAL # OF SURFACES INCLUDED IN SUBCHANNEL	NUMBER OF SPARES	SYSTEM? ()	AUXILIARY? ()
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

HP 9895 DISC WORKSHEET

STEP 1 FILL IN ICD ADDRESS NUMBER: _____

STEP 2 ONLY ONE SUBCHANNEL PER DRIVE WILL BE DEFINED. THE FOLLOWING DEFINITION IS THE HP STANDARD DEFINITION FOR 9895 FLEXIBLE DISC

SUBCHANNEL	# OF TRACKS, EXCLUDING SPARES	STARTING CYLINDER	STARTING HEAD	TOTAL # OF SURFACES INCLUDED IN SUBCHANNEL	NUMBER OF SPARES	UNIT #
DOUBLE-SIDED OPERATION						
1	134	0	0	2	20	0
2	134	0	0	2	20	1
SINGLE-SIDED OPERATION						
1	67	0	0	1	10	0
2	67	0	0	1	10	1

RTE-IV I/O CONFIGURATION WORKSHEET

PAGE ____ OF ____

SELECT CODE (OCTAL)	DEVICE NAME	DRIVER NAME (DVyxx)	LU NO. (DEC.)	EQT/SUBCH. NO. (DEC.)	INTERRUPT TABLE ENTRY	BUF. REQ. (B)	DCPC (D)	TIME-OUT (DEC. NO. OF 10 MS.)	EQT EXT. (DEC. NO. WORDS)	SYSTEM DRIVER AREA (S)	SYSTEM DRIVER AREA WITH MAPPING (M)
					,						
					,						
					,						
					,						
					,						
					,						
					,						
					,						
					,						
					,						

INITIALIZATION PHASE WORKSHEET

Initialization Phase

1 LIST FILE NAMR?

(generator listed output)

2 ECHO?

(YES or NO; YES echoes all listed output to user console)

3 OUTPUT FILE NAMR?

(contains generated system, must specify file size in blocks)

4 SYSTEM DISC MODEL?

(disc model # in destination system)

5a HP 7900 Disc Only

CONTROLLER SELECT CODE?

(lower # oct. select code for sys. disc controller)

TRKS, FIRST TRK ON SUBCHNL?

0?

_____ , _____

1?

_____ , _____

(terminate your final entry with a /E)

2?

_____ , _____

3?

_____ , _____

4?

_____ , _____

5?

_____ , _____

6?

_____ , _____

7?

_____ , _____

INITIALIZATION PHASE WORKSHEET (Cont.)

(5b) HP 7905/7906/7920/7925 Discs

CONTROLLER SELECT CODE?

(oct. select code for sys. disc controller)

MODEL, # TRKS, FIRST CYL #, HEAD, #SURFACES, UNIT, #SPARES FOR SUBCHNL:

00? _____ (enter dec.values)

01? _____ (terminate your final entry with a /E if <32 subchannels defined)

02? _____

03? _____

04? _____

05? _____

06? _____

07? _____

08? _____

09? _____

10? _____

11? _____

12? _____

13? _____

14? _____

15? _____

16? _____

INITIALIZATION PHASE WORKSHEET (Cont.)

(5b)

HP 7905/7906/7920/7925 Discs (Continued)

17?

_____ , _____ , _____ , _____ , _____ , _____ , _____

18?

_____ , _____ , _____ , _____ , _____ , _____ , _____

19?

_____ , _____ , _____ , _____ , _____ , _____ , _____

20?

_____ , _____ , _____ , _____ , _____ , _____ , _____

21?

_____ , _____ , _____ , _____ , _____ , _____ , _____

22?

_____ , _____ , _____ , _____ , _____ , _____ , _____

23?

_____ , _____ , _____ , _____ , _____ , _____ , _____

24?

_____ , _____ , _____ , _____ , _____ , _____ , _____

25?

_____ , _____ , _____ , _____ , _____ , _____ , _____

26?

_____ , _____ , _____ , _____ , _____ , _____ , _____

27?

_____ , _____ , _____ , _____ , _____ , _____ , _____

28?

_____ , _____ , _____ , _____ , _____ , _____ , _____

29?

_____ , _____ , _____ , _____ , _____ , _____ , _____

30?

_____ , _____ , _____ , _____ , _____ , _____ , _____

31?

_____ , _____ , _____ , _____ , _____ , _____ , _____

On-Line Generator Program Response Preparation

5c HP 7906H/7920H/7925H/9895 Discs

CONTROLLER SELECT CODE?

(oct. select code for sys. disc controller)

MODEL, # TRKS, FIRST CYL #, HEAD, # SURFACES, ADDRESS, # SPARES (, UNIT) FOR SUBCHNL:

00?

(enter dec. values)

01?

(terminate your final
entry with a /E if
<32 subchannels defined)

02?

03?

04?

05?

06?

07?

08?

09?

10?

11?

12?

13?

14?

15?

16?

Figure 2-1. Initialization Phase Worksheet Example (Cont.)

INITIALIZATION PHASE WORKSHEET (Cont.)

(5c) HP 7906H/7920H/7925H/9895 Discs (Continued)

17?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

18?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

19?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

20?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

21?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

22?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

23?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

24?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

25?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

26?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

27?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

28?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

29?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

30?

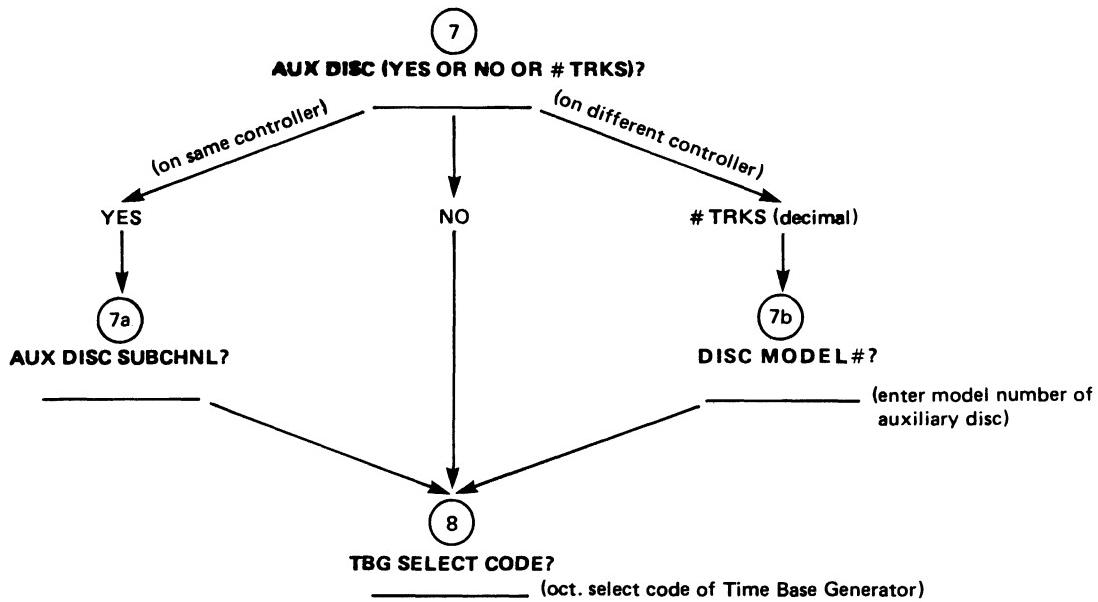
_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

31?

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

INITIALIZATION PHASE WORKSHEET (Cont.)

6 SYSTEM SUBCHNL?



9 PRIV. INT. SELECT CODE?

(oct. select code or 0)

10 MEM. RES. ACCESS TABLE AREA II?

(YES or NO)

11 RT MEMORY LOCK?

(YES or NO)

12 BG MEMORY LOCK?

(YES or NO)

13 SWAP DELAY?

(dec. value from 0 to 255 - represents tens of milliseconds)

14 MEM SIZE?

(dec. # of memory pages > 48)

15 BOOT FILE NAMR?

(file or LU # or 0)

PROGRAM INPUT PHASE WORKSHEET

PROG INPUT PHASE:

(output by generator at start of Program Input Phase)

—
(generator prompt issued throughout Program and Parameter Input Phases)

- 16a Enter mapping options using the MAP command. This command may be reentered at any time during this phase to change mapping options.

$$\left(\text{MAP} \left\{ \begin{array}{l} \text{MODULES} \\ \text{GLOBALS} \\ \text{LINKS} \\ \text{OFF} \\ \text{ALL} \end{array} \right. ; \text{ may have combinations,} \\ \text{separated by commas} \right)$$

MAP ————— [, -----]
—
optional

- 16b Enter linkage control options using the LINKS IN command. The LINKS IN command may be reentered at any time during this phase to change linkage options.

$$\left(\text{LINKS IN} \left\{ \begin{array}{l} \text{BASE} \\ \text{CURRENT} \end{array} \right. \right)$$

LINKS IN —————
—
(specify BASE or CURRENT)

PROGRAM INPUT PHASE WORKSHEET (Cont.)

- (16c) Enter the RELOCATE commands (with optional MAP, LINKS IN, and DISPLAY commands)

REL _____ (REL [(name)],filename [: sc [: cartridge label]])
- _____

(RT4GN responds with a - after each user input)

REL _____
- _____

PROGRAM INPUT PHASE WORKSHEET (Cont.)

(16c)

REL _____

(REL [(name)],filename [: sc [: cartridge label]])

REL _____

(RT4GN responds with a — after each user input)

REL _____

PROGRAM INPUT PHASE WORKSHEET (Cont.)

- (16d) Enter DISPLAY command options to obtain symbol table information, if necessary.

$\left(\text{DISPLAY } \begin{cases} \text{TABLE} \\ \text{UNDEFS [,TR]} \\ \text{symbol name} \end{cases} \right)$

DISPLAY _____ [, _____] (enter either TABLE, UNDEFS, or symbol name; UNDEFS optionally followed by a TR)

- (16e) Enter /E to terminate this phase.

PARAMETER INPUT PHASE WORKSHEET

Parameter Input Phase

(modify type, priority, and execution interval, or the ENT (entry) record of any of the programs specified during the Program Input Phase)

(17) PARAMETERS

—
_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

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_____, _____, _____, _____

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_____, _____, _____, _____

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_____, _____, _____, _____

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_____, _____, _____, _____

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_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

—
_____, _____, _____, _____

(output by generator at start of Parameter Input Phase)

(generator prompt)

(name, Type [,priority [,execution interval]])

(terminate your final entry with a /E)

PARAMETER INPUT PHASE WORKSHEET (Cont.)

18 CHANGE ENTS?

(change/create entry points?)

(generator prompt)

(entry, type - AB or RP, value)

(terminate your final entry with a /E)

PARAMETER INPUT PHASE WORKSHEET (Cont.)

18 CHANGE ENTS?

(change/create entry points?)

(generator prompt)

(entry, type - AB or RP, value)

(terminate your final entry with a /E)

PARAMETER INPUT PHASE WORKSHEET (Cont.)

(18) CHANGE ENTS?

(change/create entry points?)

(generator prompt)

(entry, type - AB or RP, value)

—
_____ , _____ , _____

—
_____ , _____ , _____

(terminate your final entry with a /E)

—
_____ , _____ , _____

—
_____ , _____ , _____

—
_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

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_____ , _____ , _____

PARAMETER INPUT PHASE WORKSHEET (Cont.)

(18) CHANGE ENTS?

—

— , — , —

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— , — , —

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—

— , — , —

(change/create entry points?)

(generator prompt)

(entry, type - AB or RP, value)

(terminate your final entry with a /E)

PARAMETER INPUT PHASE WORKSHEET (Cont.)

18 CHANGE ENTS?

(change/create entry points?)

(generator prompt)

(entry, type - AB or RP, value)

(terminate your final entry with a /E)

PARAMETER INPUT PHASE WORKSHEET (Cont.)

18 CHANGE ENTS?

(change/create entry points?)

(generator prompt)

(entry, type - AB or RP, value)

(terminate your final entry with a /E)

TABLE GENERATION PHASE WORKSHEET

TABLE AREA I << PAGE XXXXX >> :

(output by generator
at start of Table
Generation Phase)

(19) EQUIPMENT TABLE ENTRY

EQT 01?

(oct. select code,
driver [,B] [,D]
[,S] [,M] [,T = tttt]
[,X = xxx])

EQT 02?

(do not specify SDA
for system disc
driver)

EQT 03?

(terminate your
final entry with a /E)

EQT 04?

EQT 05?

EQT 06?

EQT 07?

EQT 08?

EQT 09?

EQT 10?

EQT 11?

EQT 12?

EQT 13?

EQT 14?

EQT 15?

EQT 16?

EQT 17?

EQT 18?

EQT 19?

19

Equipment Table Entry (Continued)

EQT 20?

EQT 21?

EQT 22?

EQT 23?

EQT 24?

EQT 25?

EQT 26?

EQT 27?

EQT 28?

EQT 29?

EQT 30?

EQT 31?

EQT 32?

EQT 33?

EQT 34?

EQT 35?

EQT 36?

EQT 37?

EQT 38?

EQT 39?

(19)

Equipment Table Entry (Continued)

EQT 40?

EQT 41?

EQT 42?

EQT 43?

EQT 44?

EQT 45?

EQT 46?

EQT 47?

EQT 48?

EQT 49?

EQT 50?

EQT 51?

EQT 52?

EQT 53?

EQT 54?

EQT 55?

EQT 56?

EQT 57?

EQT 58?

EQT 59?

Figure 2-7. Table Generation Phase Worksheet Example (Continued)

(19) Equipment Table Entry (Continued)

EQT 60?

EQT 61?

EQT 62?

EQT 63?

TABLE GENERATION PHASE WORKSHEET (Cont.)

(20)

DEVICE REFERENCE TABLE

(system console)	001 = EQT # ?	(LU1 = EQT # ?)
	_____ , _____	(eqt entry, optional subchannel; the subchannel # should match the response in Step (6))
(system disc)	002 = EQT # ?	(terminate your final entry with a /E)
(auxiliary disc)	003 = EQT # ?	(number should match response to Step (7a), if entered)
(standard output)	004 = EQT # ?	
(standard input)	005 = EQT # ?	
(standard list)	006 = EQT # ?	
	007 = EQT # ?	
(mag. tape)	008 = EQT # ?	
	009 = EQT # ?	
	010 = EQT # ?	
	011 = EQT # ?	
	012 = EQT # ?	
	013 = EQT # ?	
	014 = EQT # ?	
	015 = EQT # ?	
	016 = EQT # ?	
	017 = EQT # ?	
	018 = EQT # ?	
	019 = EQT # ?	
	020 = EQT # ?	
	_____ , _____	

Device Reference Table (Continued)

021 = EQT #?	041 = EQT #?	061 = EQT #?
_____, _____	_____, _____	_____, _____
022 = EQT #?	042 = EQT #?	062 = EQT #?
_____, _____	_____, _____	_____, _____
023 = EQT #?	043 = EQT #?	063 = EQT #?
_____, _____	_____, _____	_____, _____
024 = EQT #?	044 = EQT #?	064 = EQT #?
_____, _____	_____, _____	_____, _____
025 = EQT #?	045 = EQT #?	065 = EQT #?
_____, _____	_____, _____	_____, _____
026 = EQT #?	046 = EQT #?	066 = EQT #?
_____, _____	_____, _____	_____, _____
027 = EQT #?	047 = EQT #?	067 = EQT #?
_____, _____	_____, _____	_____, _____
028 = EQT #?	048 = EQT #?	068 = EQT #?
_____, _____	_____, _____	_____, _____
029 = EQT #?	049 = EQT #?	069 = EQT #?
_____, _____	_____, _____	_____, _____
030 = EQT #?	050 = EQT #?	070 = EQT #?
_____, _____	_____, _____	_____, _____
031 = EQT #?	051 = EQT #?	071 = EQT #?
_____, _____	_____, _____	_____, _____
032 = EQT #?	052 = EQT #?	072 = EQT #?
_____, _____	_____, _____	_____, _____
033 = EQT #?	053 = EQT #?	073 = EQT #?
_____, _____	_____, _____	_____, _____
034 = EQT #?	054 = EQT #?	074 = EQT #?
_____, _____	_____, _____	_____, _____
035 = EQT #?	055 = EQT #?	075 = EQT #?
_____, _____	_____, _____	_____, _____
036 = EQT #?	056 = EQT #?	076 = EQT #?
_____, _____	_____, _____	_____, _____
037 = EQT #?	057 = EQT #?	077 = EQT #?
_____, _____	_____, _____	_____, _____
038 = EQT #?	058 = EQT #?	078 = EQT #?
_____, _____	_____, _____	_____, _____
039 = EQT #?	059 = EQT #?	079 = EQT #?
_____, _____	_____, _____	_____, _____
040 = EQT #?	060 = EQT #?	080 = EQT #?
_____, _____	_____, _____	_____, _____

20

Device Reference Table (Continued)

081 = EQT # ?
_____, _____082 = EQT # ?
_____, _____083 = EQT # ?
_____, _____084 = EQT # ?
_____, _____085 = EQT # ?
_____, _____086 = EQT # ?
_____, _____087 = EQT # ?
_____, _____088 = EQT # ?
_____, _____089 = EQT # ?
_____, _____090 = EQT # ?
_____, _____091 = EQT # ?
_____, _____092 = EQT # ?
_____, _____093 = EQT # ?
_____, _____094 = EQT # ?
_____, _____095 = EQT # ?
_____, _____096 = EQT # ?
_____, _____097 = EQT # ?
_____, _____098 = EQT # ?
_____, _____099 = EQT # ?
_____, _____100 = EQT # ?
_____, _____101 = EQT # ?
_____, _____102 = EQT # ?
_____, _____103 = EQT # ?
_____, _____104 = EQT # ?
_____, _____105 = EQT # ?
_____, _____106 = EQT # ?
_____, _____107 = EQT # ?
_____, _____108 = EQT # ?
_____, _____109 = EQT # ?
_____, _____110 = EQT # ?
_____, _____111 = EQT # ?
_____, _____112 = EQT # ?
_____, _____113 = EQT # ?
_____, _____114 = EQT # ?
_____, _____115 = EQT # ?
_____, _____116 = EQT # ?
_____, _____117 = EQT # ?
_____, _____118 = EQT # ?
_____, _____119 = EQT # ?
_____, _____120 = EQT # ?
_____, _____121 = EQT # ?
_____, _____122 = EQT # ?
_____, _____123 = EQT # ?
_____, _____124 = EQT # ?
_____, _____125 = EQT # ?
_____, _____126 = EQT # ?
_____, _____127 = EQT # ?
_____, _____128 = EQT # ?
_____, _____129 = EQT # ?
_____, _____130 = EQT # ?
_____, _____131 = EQT # ?
_____, _____132 = EQT # ?
_____, _____133 = EQT # ?
_____, _____134 = EQT # ?
_____, _____135 = EQT # ?
_____, _____136 = EQT # ?
_____, _____137 = EQT # ?
_____, _____138 = EQT # ?
_____, _____139 = EQT # ?
_____, _____140 = EQT # ?
_____, _____

Device Reference Table (Continued)

141 = EQT # ? _____

161 = EQT # ? _____

181 = EQT # ? _____

142 = EQT # ? _____

162 = EQT # ? _____

182 = EQT # ? _____

143 = EQT # ? _____

163 = EQT # ? _____

183 = EQT # ? _____

144 = EQT # ? _____

164 = EQT # ? _____

184 = EQT # ? _____

145 = EQT # ? _____

165 = EQT # ? _____

185 = EQT # ? _____

146 = EQT # ? _____

166 = EQT # ? _____

186 = EQT # ? _____

147 = EQT # ? _____

167 = EQT # ? _____

187 = EQT # ? _____

148 = EQT # ? _____

168 = EQT # ? _____

188 = EQT # ? _____

149 = EQT # ? _____

169 = EQT # ? _____

189 = EQT # ? _____

150 = EQT # ? _____

170 = EQT # ? _____

190 = EQT # ? _____

151 = EQT # ? _____

171 = EQT # ? _____

191 = EQT # ? _____

152 = EQT # ? _____

172 = EQT # ? _____

192 = EQT # ? _____

153 = EQT # ? _____

173 = EQT # ? _____

193 = EQT # ? _____

154 = EQT # ? _____

174 = EQT # ? _____

194 = EQT # ? _____

155 = EQT # ? _____

175 = EQT # ? _____

195 = EQT # ? _____

156 = EQT # ? _____

176 = EQT # ? _____

196 = EQT # ? _____

157 = EQT # ? _____

177 = EQT # ? _____

197 = EQT # ? _____

158 = EQT # ? _____

178 = EQT # ? _____

198 = EQT # ? _____

159 = EQT # ? _____

179 = EQT # ? _____

199 = EQT # ? _____

160 = EQT # ? _____

180 = EQT # ? _____

200 = EQT # ? _____

20

Device Reference Table (Continued)

201 = EQT # ?
_____, _____202 = EQT # ?
_____, _____203 = EQT # ?
_____, _____204 = EQT # ?
_____, _____205 = EQT # ?
_____, _____206 = EQT # ?
_____, _____207 = EQT # ?
_____, _____208 = EQT # ?
_____, _____209 = EQT # ?
_____, _____210 = EQT # ?
_____, _____211 = EQT # ?
_____, _____212 = EQT # ?
_____, _____213 = EQT # ?
_____, _____214 = EQT # ?
_____, _____215 = EQT # ?
_____, _____216 = EQT # ?
_____, _____217 = EQT # ?
_____, _____218 = EQT # ?
_____, _____219 = EQT # ?
_____, _____220 = EQT # ?
_____, _____221 = EQT # ?
_____, _____222 = EQT # ?
_____, _____223 = EQT # ?
_____, _____224 = EQT # ?
_____, _____225 = EQT # ?
_____, _____226 = EQT # ?
_____, _____227 = EQT # ?
_____, _____228 = EQT # ?
_____, _____229 = EQT # ?
_____, _____230 = EQT # ?
_____, _____231 = EQT # ?
_____, _____232 = EQT # ?
_____, _____233 = EQT # ?
_____, _____234 = EQT # ?
_____, _____235 = EQT # ?
_____, _____236 = EQT # ?
_____, _____237 = EQT # ?
_____, _____238 = EQT # ?
_____, _____239 = EQT # ?
_____, _____240 = EQT # ?
_____, _____241 = EQT # ?
_____, _____242 = EQT # ?
_____, _____243 = EQT # ?
_____, _____244 = EQT # ?
_____, _____245 = EQT # ?
_____, _____246 = EQT # ?
_____, _____247 = EQT # ?
_____, _____248 = EQT # ?
_____, _____249 = EQT # ?
_____, _____250 = EQT # ?
_____, _____251 = EQT # ?
_____, _____252 = EQT # ?
_____, _____253 = EQT # ?
_____, _____254 = EQT # ?
_____, _____

TABLE GENERATION PHASE WORKSHEET (Cont.)

21

INTERRUPT TABLE

—

— , — , —

— 6 —

—

— , — , —

—

—

—

— , — , —

—, —, —

—

_____ , _____ , _____

_____ / _____ / _____

(enter octal select codes in ascending order)

(generator prompt)

(select code, option, destination)

(terminate your final entry with a /E)

SYSTEM BOUNDARIES PHASE WORKSHEET

(22)	DRIVR PART 00002	(dec. # of pages)
	CHANGE DRIVR PART?	(increase driver partition size?) (enter dec. # of pages > reported value and < 17, otherwise 0)
	DP 01 <<PAGE XXXXX>> :	
	DVY3 x map here	(load map for system disc driver plus any other drivers that will fit in this driver partition)
(23)	RT COMMONxxxxx	(dec. # of words)
	CHANGE RT COMMON?	(change real-time COMMON?) (enter dec. # of WORDS > reported value, otherwise 0)
	RT COMMON ADD xxxx	(octal address)
(24)	BG COMMONxxxxx	(reported in dec. words)
	CHANGE BG COMMON?	(change background COMMON?) (enter dec. # of PAGE increments - 1024 words each, otherwise 0)
	BG COMMON ADD xxxx	(octal address)
	BG COMMONxxxx	

Figure 2-8. System Boundaries Phase Worksheet Example

SYSTEM AND PROGRAM LOADING PHASE WORKSHEET

TABLE AREA II <<PAGE XXXXX>> :

- (25) # OF I/O CLASSES?
 (dec. # from 1 to 255; typical entry would be 10)
- (26) # OF LU MAPPINGS?
 (dec. # from 1 to 255; typical entry would be 10)
- (27) # OF RESOURCE NUMBERS?
 (dec. # from 1 to 255)
- (28) BUFFER LIMITS (LOW, HIGH)?
, (in words, suggested entry would be 100, 400)
- (29) XXXX LONG ID SEGMENTS USED
OF BLANK LONG ID SEGMENTS?
 (# USED)
("long" ID segments)
(total # should be from 1 to 254)
- (30) XXXX SHORT ID SEGMENTS USED
OF BLANK SHORT ID SEGMENTS?
 (# USED)
(total # should be from 1 to 256)
- (31) XXXX ID EXTENSIONS USED
OF BLANK ID EXTENSIONS?
 (# USED)
(total # should be from 1 to 254)
- (32) MAXIMUM # OF PARTITIONS?
 (dec. # < 64)

Figure 2-9. System and Program Loading Phase Worksheet Example

PARTITION DEFINITION PHASE WORKSHEET

Partition Definition Phase

RT PARTITION REQMTS: (generator lists page requirements)

•
•
•

BG PARTITION REQMTS:

•
•
•

MAXIMUM PROGRAM SIZE:

W/O COM xx PAGES
W/ COM xx PAGES
W/ TA2 xx PAGES

SYS AV MEM: xxxxx WORDS

(reported in decimal words)

(33)

ENTER 1ST PART PAGE: XXXXX (DEFAULT) TO YYYYY:

(enter dec. pages # value between XXXXX and YYYYY, otherwise 0 - for default value XXXXX)

SYS AV MEM: xxxxx WORDS

(new size of SAM reported, decimal words):

PAGES REMAINING: xxxxx

(pages remaining for partitioning)

(34)

**DEFINE PARTITIONS:
PART 01, XXXX PAGES?**

_____, _____, _____

(see manual about subpartitions)

(prompts to maximum of 64, displaying # pages remaining, may ask for SUBPARTITIONS)
(decimal page size, type , [R])

PART 02, XXXX PAGES?

_____, _____, _____

(subpartition mode - the number in parenthesis indicates the number of pages remaining in the mother partition)

PART 03, XXXX,(YYYY) PAGES

_____, _____, _____

PART 04, XXXX PAGES?

_____, _____, _____

PART 05, XXXX PAGES?

_____, _____, _____

PART 06, XXXX PAGES?

_____, _____, _____

PART 07, XXXX PAGES?

(terminate your final entry with a /E)

PARTITION DEFINITION PHASE WORKSHEET (Cont.)

34

PARTITION DEFINITION PHASE WORKSHEET (Cont.)

34

PARTITION DEFINITION PHASE WORKSHEET (Cont.)

34

Appendix E

Sample Answer File

**This sample Answer File reflects
Software Revision 2001
(January 1980).**

"ONGE T-00003 IS ON CR AJ USING 00024 BLKS R-00000

0001 *****SYSTEM GENERATION ANSWER FILE*****

0002 *****

0003 *****SESSION MONITOR*****

0004 *

0005 *****INITIALIZATION PHASE*****

0006 *

0007 SYSLI:DR:JA::500 * LIST FILE

0008 YES * ECHO ON

0009 SESSY:DR:JA::4500 * OUTPUT FILE

0010 7925 * 7925 SYSTEM DISC

0011 12 * CONTROLLER SELECT CODE

0012 * DISC #TRKS 1ST-CYL HEAD #SURFACES UNIT #SPARES

0013 7925, 256, 0, 0, 9, 0, 5 *SUBCHANNEL 0

0014 7925, 1500, 29, 0, 9, 0, 66 *SUBCHANNEL 1

0015 7925, 193, 203, 0, 9, 0, 5 *SUBCHANNEL 2

0016 7925, 193, 225, 0, 9, 0, 5 *SUBCHANNEL 3

0017 7925, 193, 247, 0, 9, 0, 5 *SUBCHANNEL 4

0018 7925, 193, 269, 0, 9, 0, 5 *SUBCHANNEL 5

0019 7925, 193, 291, 0, 9, 0, 5 *SUBCHANNEL 6

0020 7925, 193, 313, 0, 9, 0, 5 *SUBCHANNEL 7

0021 7925, 193, 335, 0, 9, 0, 5 *SUBCHANNEL 8

0022 7925, 193, 357, 0, 9, 0, 5 *SUBCHANNEL 9

0023 7925, 193, 379, 0, 9, 0, 5 *SUBCHANNEL 10

0024 7925, 193, 401, 0, 9, 0, 5 *SUBCHANNEL 11

0025 7925, 256, 423, 0, 9, 0, 5 *SUBCHANNEL 12

0026 7925, 193, 452, 0, 9, 0, 5 *SUBCHANNEL 13

0027 7925, 193, 474, 0, 9, 0, 5 *SUBCHANNEL 14

0028 7925, 193, 496, 0, 9, 0, 5 *SUBCHANNEL 15

0029 7925, 193, 518, 0, 9, 0, 5 *SUBCHANNEL 16

0030 7925, 193, 540, 0, 9, 0, 5 *SUBCHANNEL 17

0031 7925, 193, 562, 0, 9, 0, 5 *SUBCHANNEL 18

0032 7925, 193, 584, 0, 9, 0, 5 *SUBCHANNEL 19

0033 7925, 193, 606, 0, 9, 0, 5 *SUBCHANNEL 20

0034 7925, 193, 628, 0, 9, 0, 5 *SUBCHANNEL 21

0035 7925, 193, 650, 0, 9, 0, 5 *SUBCHANNEL 22

0036 7925, 193, 672, 0, 9, 0, 5 *SUBCHANNEL 23

0037 7925, 96, 694, 0, 9, 0, 3 *SUBCHANNEL 24

0038 7925, 154, 705, 0, 9, 0, 3 *SUBCHANNEL 25

0039 7925, 96, 722, 0, 9, 0, 3 *SUBCHANNEL 26

0040 7925, 96, 733, 0, 9, 0, 3 *SUBCHANNEL 27

0041 7925, 194, 744, 0, 9, 0, 4 *SUBCHANNEL 28

0042 7925, 194, 766, 0, 9, 0, 4 *SUBCHANNEL 29

0043 7925, 194, 788, 0, 9, 0, 4 *SUBCHANNEL 30

0044 7925, 114, 810, 0, 9, 0, 3 *SUBCHANNEL 31

0045 0 * SYSTEM SUBCHANNEL

0046 YES * AUXILIARY DISC

0047 12 * AUXILIARY DISC SUBCHANNEL

0048 10 * TRG SELECT CODE

0049 0 * NO PRTVILEGED INT. CARD

0050 YES * MEM. RES. ACCESS TABLE AREA II

0051 YES * RT MEMORY LOCK

0052 YES * BG MEMORY LOCK

0053 50 * SWAP DELAY

0054 512 * MEMORY SIZE

0055 0 * BOOT FILE NAME

0056 *

0057 *

0058 *****PROGRAM INPUT PHASE*****

```

0059 *
0060 *
0061 MAP ALL                                *MAP MODULES,GLOBALS,LINKS
0062 LINKS IN CURRENT
0063 REL,%CR4S1::SM                         * RTE-IVB OP SYS
0064 REL,%CR4S2::SM                         * RTE-IVB OP SYS
0065 REL,%RCNFX::SM                         * CONFIGURATOR EXTENSION
0066 REL,%WHZAT::SM                          * WHZAT (REV. CODE 2001 OR GREATER)
0067 REL,%4AUTR::SM                         * AUTO RESTART
0068 *
0069 *****DRIVERS*****
0070 *
0071 REL,%DVR32::SM                           * 7905/06/20/25 DISC DRIVER
0072 REL,%DVA32::SM                           * 7906H/7920H/7925H DISC DRIVER
0073 REL,%STA32::SM                           * DVA32 TRACK MAP TABLE
0074 REL,%DVR23::SM                           * 7970 MAG TAPE DRIVER
0075 REL,%DVA05::SM                           * 264X TERMINAL DRIVER
0076 REL,%4DP43::SM                           * RTE-IVB POWER FAIL
0077 REL,%2DV37::SM                           * HPIB DRIVER
0078 REL,%SRQ.P::SM                           * FOR HPIB
0079 REL,%DVA12::SM                           * FOR 2631 LINE PRINTER
0080 *
0081 *****LIBRARIES*****
0082 *
0083 MAP OFF,MODULES
0084 REL,%CLIB::SM                            * COMPILER LIBRARY
0085 REL,%FF4.N::SM                           * FORTRAN-IV LIBRARY
0086 REL,%RLIB1::SM                           * DOS-RTE RELOC. LIBRARY
0087 REL,%RLIB2::SM                           * DOS-RTE RELOC. LIBRARY
0088 REL,%RLIB3::SM                           * DOS-RTE RELOC. LIBRARY
0089 REL,%4SYLB::SM                           * SYSTEM LIBRARY
0090 REL,%LDRLB::SM                           * LOADER LIBRARY
0091 REL,%DBUGR::SM                           * USER DEBUG LIBRARY
0092 REL,%DSCLB::SM                           * ICO/MAC UTILITY LIBRARY
0093 REL,%DKULB::SM                           * ICO/MAC DISC BACKUP LIBRARY
0094 REL,%DECAR::SM                           * DECIMAL STRING ARITHMETIC LIB
0095 REL,%IB4A::SM                            * HPIB LIBRARY
0096 REL,%UTLIR::SM                           * UTIL.LIB.FOR COMPL,CLOAD,READT,WRITT
0097 REL,%BAMLB::SM                           * BASIC CORE RESIDENT LIBRARY
0098 REL,%BASLB::SM                           * BASIC SUBROUTINE LIBRARY
0099 REL,%VLIB::SM                            * VIS LIBRARY
0100 *
0101 *****
0102 *
0103 REL,%BMPG1::SM                           * FILE MANAGER - PART 1
0104 REL,%BMPG2::SM                           * FILE MANAGER - PART 2
0105 REL,%BMPG3::SM                           * FILE MANAGER - PART 3
0106 *****
0107 REL,%SMON1::SM                           * SESSION MONITOR #1
0108 REL,%SMON2::SM                           * SESSION MONITOR #2
0109 REL,%SP01B::SM                           * SPOOLING
0110 REL,%SP02B::SM                           * SPOOLING
0111 *
0112 *****
0113 *
0114 REL,%4LDR::SM                            * LOADR
0115 REL,%EDITR::SM                           * EDITOR
0116 *
0117 *****
0118 *

```

```

0119 REL,XLGSTAT::SM          * LGTAT UTILITY
0120 *
0121 *****★PROGRAMS*****★
0122 *
0123 REL,XLSAVE::SM           * LU SAVE PROGRAM
0124 REL,XUSAVE::SM           * UNIT SAVE PROGRAM
0125 REL,XRESTR::SM           * RESTORE PROGRAM
0126 REL,XLCOPY::SM            * COPY PROGRAM
0127 REL,XCOMPL::SM           * COMPL PROGRAM
0128 REL,XCLOAD::SM            * CLOAD PROGRAM
0129 REL,XREADT::SM            * READT UTILITY
0130 REL,XWRITT::SM            * WRITT UTILITY
0131 REL,XHELP::SM             * HELP UTILITY
0132 REL,XACCTS::SM            * ACCOUNTS PROGRAM
0133 DISPLAY UNDEFS,TR
0134 /E
0135 *
0136 *****PARAMETER INPUT PHASE*****
0137 *
0138 D.RTR,1,1
0139 WHZAT,1,41
0140 /E
0141 *
0142 *****CHANGE ENTS?*****
0143 *
0144 *
0145 *****SCIENTIFIC INSTRUCTION SET*****
0146 *
0147 TAN,RP,105320
0148 SQRT,RP,105321
0149 ALOG,RP,105322
0150 ATAN,RP,105323
0151 COS,RP,105324
0152 SIN,RP,105325
0153 EXP,RP,105326
0154 ALOGT,RP,105327
0155 TANH,RP,105330
0156 DPOLY,RP,105331
0157 /CMRT,RP,105332
0158 /ATLG,RP,105333
0159 .FPWR,RP,105334
0160 .TPWR,RP,105335
0161 *
0162 *
0163 *****DOUBLE INTEGER*****
0164 *
0165 *
0166 .DAD,RP,105014
0167 .DSB,RP,105034
0168 .DMP,RP,105054
0169 .DDI,RP,105074
0170 .DSBR,RP,105114
0171 .DDIR,RP,105134
0172 .DNG,RP,105203
0173 .DIN,RP,105210
0174 .DDE,RP,105211
0175 .DIS,RP,105212
0176 .DDS,RP,105213
0177 .DCO,RP,105204
0178 *

```

```

0179 *
0180 ****FAST FORTRAN*****
0181 *
0182 *
0183 DBLE,RP,105201
0184 SNGL,RP,105202
0185 .DFER,RP,105205
0186 .XPAK,RP,105206
0187 .BLE,RP,105207
0188 .NGL,RP,105214
0189 .XCOM,RP,105215
0190 ..DCM,RP,105216
0191 DDINT,RP,105217
0192 .XFER,RP,105220
0193 .GOTO,RP,105221
0194 ..MAP,RP,105222
0195 .ENTR,RP,105223
0196 .ENTP,RP,105224
0197 .PWR2,RP,105225
0198 .FLUN,RP,105226
0199 $SETP,RP,105227
0200 .PACK,RP,105230
0201 .CFER,RP,105231
0202 ..FCM,RP,105232
0203 ..TCM,RP,105233
0204 .LBT,RP,105763
0205 .SBT,RP,105764
0206 .DLD,RP,104200
0207 .DST,RP,104400
0208 .MPY,RP,100200
0209 .DIV,RP,100400
0210 CLRIO,RP,2001
0211 *
0212 *
0213 ****HFPP - TWO WORD*****
0214 *
0215 *
0216 .FAD,RP,105000
0217 .FSB,RP,105020
0218 .FMP,RP,105040
0219 .FDV,RP,105060
0220 IFIX,RP,105100
0221 .FIXD,RP,105104
0222 FLOAT,RP,105120
0223 .FLTD,RP,105124
0224 *
0225 *
0226 ****HFPP - THREE WORD*****
0227 *
0228 *
0229 .XADD,RP,105001
0230 .XSUB,RP,105021
0231 .XMPY,RP,105041
0232 .XDIV,RP,105061
0233 .XFXS,RP,105101
0234 .DINT,RP,105101
0235 .XFxD,RP,105105
0236 .XFTS,RP,105121
0237 .IDBL,RP,105121
0238 .XFTD,RP,105125

```

0239 *

0240 *

0241 *****HFPP = FOUR WORD*****

0242 *

0243 *

0244 .TADD,RP,105002

0245 .TSUB,RP,105022

0246 .TMPY,RP,105042

0247 .TDIV,RP,105062

0248 .TFXS,RP,105102

0249 .TINT,RP,105102

0250 .TFXD,RP,105106

0251 .TFTS,RP,105122

0252 .ITBL,RP,105122

0253 .TFTD,RP,105126

0254 *

0255 *

0256 *****EMA*****

0257 *

0258 *

0259 .EMAP,RP,105257

0260 .EMIO,RP,105240

0261 MMAP,RP,105241

0262 *

0263 *

0264 ****

0265 *

0266 *

0267 .MVW,RP,105777

0268 .CMW,RP,105776

0269 *

0270 *

0271 * FOUR WORD DOUBLE PRECISION

0272 *

0273 *

0274 ZSOBL,RP,4

0275 *

0276 *

0277 *****VECTOR INSTRUCTION SET*****

0278 *****VECT,RP,101460

0279 VPIV,RP,101461

0280 VABS,RP,101462

0281 VSUM,RP,101463

0282 VNRM,RP,101464

0283 VDOT,RP,101465

0284 VMAX,RP,101466

0285 VMAB,RP,101467

0286 VMIN,RP,101470

0287 VMIB,RP,101471

0288 VMOV,RP,101472

0289 VSWP,RP,101473

0290 .ERES,RP,101474

0291 .ESEG,RP,101475

0292 .VSET,RP,101476

```

0299 *
0300 ***DOUBLE PRECISION***
0301 *
0302 .DVCT,RP,105460
0303 DVPIV,RP,105461
0304 DVABS,RP,105462
0305 DVSUM,RP,105463
0306 DVNRM,RP,105464
0307 DVDOT,RP,105465
0308 DVMAX,RP,105466
0309 DVMA8,RP,105467
0310 DVMIN,RP,105470
0311 DVMIR,RP,105471
0312 DVMOV,RP,105472
0313 DVSWP,RP,105473
0314 *
0315 *
0316 *
0317 /E
0318 *
0319 *****
0320 *****TABLE GENERATION PHASE*****
0321 *****
0322 *
0323 *****EQUIPMENT TABLE*****
0324 *
0325 11,DVR32,D * EQT 01 7925 DISC
0326 12,DVA32,D,T=200 * EQT 02 7906H DISC
0327 13,DVA05,B,X=13,T=12000 * EQT 03 SYSTEM CONSOLE (2645)
0328 14,DVA12,B,X=13,T=300 * EQT 04 2631 LINE PRINTER
0329 15,DVR37,B,X=50,T=20000 * EQT 05 HPIB
0330 16,DVR23,B,D * EQT 06 7970 MAG TAPE
0331 20,DVA05,B,X=13,T=12000 * EQT 07 2645 TERMINAL
0332 21,DVA05,B,X=13,T=12000 * EQT 08 2645 TERMINAL
0333 22,DVA05,B,X=13,T=12000 * EQT 09 2645 TERMINAL
0334 23,DVA05,B,X=13,T=12000 * EQT 10 2645 TERMINAL
0335 24,DVA05,B,X=13,T=12000 * EQT 11 2648 TERMINAL
0336 25,DVA05,B,X=13,T=12000 * EQT 12 2648 TERMINAL
0337 26,DVA05,B,X=13,T=12000 * EQT 13 2648 TERMINAL
0338 70,DVS43,M,X=18 * EQT 14 SPOOLING
0339 71,DVS43,M,X=18 * EQT 15 SPOOLING
0340 72,DVS43,M,X=18 * EQT 16 SPOOLING
0341 73,DVS43,M,X=18 * EQT 17 SPOOLING
0342 74,DVS43,M,X=18 * EQT 18 SPOOLING
0343 75,DVS43,M,X=18 * EQT 19 SPOOLING
0344 76,DVS43,M,X=18 * EQT 20 SPOOLING
0345 77,DVS43,M,X=18 * EQT 21 SPOOLING
0346 4,DVP43,M * EQT 22 POWER FAIL
0347 /E
0348 *
0349 *****DEVICE REFERENCE TABLE*****
0350 *
0351 3 * LU 01 SYSTEM CONSOLE
0352 1 * LU 02 SYSTEM DISC (SUBCHANNEL 0)
0353 1,12 * LU 03 AUX. DISC (SUBCHANNEL 12)
0354 3,1 * LU 04 LEFT CTU
0355 3,2 * LU 05 RIGHT CTU
0356 4 * LU 06 2631 LINE PRINTER
0357 5 * LU 07 HPIB
0358 6 * LU 08 7970 MAG TAPE

```

0359	1,1	★ LU 09 DISC SUBCHANNEL 1
0360	1,2	★ LU 10 DISC SUBCHANNEL 2
0361	1,3	★ LU 11 DISC SUBCHANNEL 3
0362	1,4	★ LU 12 DISC SUBCHANNEL 4
0363	1,5	★ LU 13 DISC SUBCHANNEL 5
0364	1,6	★ LU 14 DISC SUBCHANNEL 6
0365	1,7	★ LU 15 DISC SUBCHANNEL 7
0366	1,8	★ LU 16 DISC SUBCHANNEL 8
0367	1,9	★ LU 17 DISC SUBCHANNEL 9
0368	1,10	★ LU 18 DISC SUBCHANNEL 10
0369	1,11	★ LU 19 DISC SUBCHANNEL 11
0370	1,13	★ LU 20 DISC SUBCHANNEL 13
0371	1,14	★ LU 21 DISC SUBCHANNEL 14
0372	1,15	★ LU 22 DISC SUBCHANNEL 15
0373	1,16	★ LU 23 DISC SUBCHANNEL 16
0374	1,17	★ LU 24 DISC SUBCHANNEL 17
0375	1,18	★ LU 25 DISC SUBCHANNEL 18
0376	1,19	★ LU 26 DISC SUBCHANNEL 19
0377	1,20	★ LU 27 DISC SUBCHANNEL 20
0378	1,21	★ LU 28 DISC SUBCHANNEL 21
0379	1,22	★ LU 29 DISC SUBCHANNEL 22
0380	1,23	★ LU 30 DISC SUBCHANNEL 23
0381	1,24	★ LU 31 DISC SUBCHANNEL 24
0382	1,25	★ LU 32 DISC SUBCHANNEL 25
0383	1,26	★ LU 33 DISC SUBCHANNEL 26
0384	1,27	★ LU 34 DISC SUBCHANNEL 27
0385	1,28	★ LU 35 DISC SUBCHANNEL 28
0386	1,29	★ LU 36 DISC SUBCHANNEL 29
0387	1,30	★ LU 37 DISC SUBCHANNEL 30
0388	1,31	★ LU 38 DISC SUBCHANNEL 31
0389	2	★ LU 39 7906H DTSC SUBCH 00
0390	2,1	★ LU 40 7906H DTSC SUBCH 01
0391	2,2	★ LU 41 7906H DTSC SUBCH 02
0392	2,3	★ LU 42 7906H DTSC SUBCH 03
0393	2,4	★ LU 43 7906H DTSC SUBCH 04
0394	2,5	★ LU 44 7906H DTSC SUBCH 05
0395	2,6	★ LU 45 7906H DTSC SUBCH 06
0396	2,7	★ LU 46 7906H DTSC SUBCH 07
0397	2,8	★ LU 47 7906H DTSC SUBCH 08
0398	2,9	★ LU 48 7906H DTSC SUBCH 09
0399	22	★ LU 49 POWER FAIL
0400	7	★ LU 50 2645 TERMINAL #1
0401	8	★ LU 51 2645 TERMINAL #2
0402	9	★ LU 52 2645 TERMINAL #3
0403	10	★ LU 53 2645 TERMINAL #4
0404	11	★ LU 54 2648 TERMINAL #5
0405	12	★ LU 55 2648 TERMINAL #6
0406	13	★ LU 56 2648 TERMINAL #7
0407	7,1	★ LU 57 TERMINAL #1 LEFT CTU
0408	7,2	★ LU 58 TERMINAL #1 RIGHT CTU
0409	7,4	★ LU 59 TERMINAL #1 AUX. PRINTER
0410	8,1	★ LU 60 TERMINAL #2 LEFT CTU
0411	8,2	★ LU 61 TERMINAL #2 RIGHT CTU
0412	8,4	★ LU 62 TERMINAL #2 AUX. PRINTER
0413	9,1	★ LU 63 TERMINAL #3 LEFT CTU
0414	9,2	★ LU 64 TERMINAL #3 RIGHT CTU
0415	9,4	★ LU 65 TERMINAL #3 AUX. PRINTER
0416	10,1	★ LU 66 TERMINAL #4 LEFT CTU
0417	10,2	★ LU 67 TERMINAL #4 RIGHT CTU
0418	10,4	★ LU 68 TERMINAL #4 AUX. PRINTER

```

0419 11,1
0420 11,2
0421 11,3
0422 11,4
0423 12,1
0424 12,2
0425 12,3
0426 12,4
0427 13,1
0428 13,2
0429 13,3
0430 13,4
0431 14
0432 15
0433 16
0434 17
0435 18
0436 19
0437 20
0438 21
0439 /E
0440 *
0441 ***** INTERRUPT TABLE *****
0442 *
0443 4,ENT,$POWR
0444 11,EQT,1
0445 12,EQT,2
0446 13,EQT,3
0447 14,EQT,4
0448 15,EQT,5
0449 16,EQT,6
0450 17,EQT,6
0451 20,PRG,PRMPT
0452 21,PRG,PRMPT
0453 22,PRG,PRMPT
0454 23,PRG,PRMPT
0455 24,PRG,PRMPT
0456 25,PRG,PRMPT
0457 26,PRG,PRMPT
0458 70,EQT,14
0459 71,EQT,15
0460 72,EQT,16
0461 73,EQT,17
0462 74,EQT,18
0463 75,EQT,19
0464 76,EQT,20
0465 77,EQT,21
0466 /E
0467 *
0468 *****SYSTEM BOUNDARIES
0469 *
0470 0
0471 100
0472 1
0473 *
0474 *****RESOURCES TABLES
0475 *
0476 64
0477 10
0478 32
* LU 69 TERMINAL #5 LEFT CTU
* LU 70 TERMINAL #5 RIGHT CTU
* LU 71 TERMINAL #5 GRAPHICS
* LU 72 TERMINAL #5 AUX. PRINTER
* LU 73 TERMINAL #6 LEFT CTU
* LU 74 TERMINAL #6 RIGHT CTU
* LU 75 TERMINAL #6 GRAPHICS
* LU 76 TERMINAL #6 AUX. PRINTER
* LU 77 TERMINAL #7 LEFT CTU
* LU 78 TERMINAL #7 RIGHT CTU
* LU 79 TERMINAL #7 GRAPHICS
* LU 80 TERMINAL #7 AUX. PRINTER
* LU 81 SPOOLING
* LU 82 SPOOLING
* LU 83 SPOOLING
* LU 84 SPOOLING
* LU 85 SPOOLING
* LU 86 SPOOLING
* LU 87 SPOOLING
* LU 88 SPOOLING
* POWER FAIL
* 7925 DISC
* 7906H DISC
* SYSTEM CONSOLE
* 2631 LINE PRINTER
* HPIB
* 7970 MAG TAPE
* 7970 MAG TAPE
* TERMINAL #1
* TERMINAL #2
* TERMINAL #3
* TERMINAL #4
* TERMINAL #5
* TERMINAL #6
* TERMINAL #7
* SPOOLING
* CHANGE DRIVFR PART
* CHANGE RT COMMON
* CHANGE BG COMMON
* # I/O CLASSES
* LU MAPPINGS
* # R.N.'S

```

0479 100,400
0480 32
0481 50
0482 4
0483 32
0484 TR,1

* BUFFER LIMITS
* ADDITIONAL BLANK ID SEG'S
* ADDITIONAL SHORT ID SEG'S
* ADDITIONAL IO EXTENSIONS
* PARTITIONS

Appendix F

Sample Generation Listing

**This sample generation listing reflects
Software Revision 2001 (January 1980).**

SYSLI T=000003 IS ON CR JA USING 00500 BLKS R=00000

0001
0002 RTE-IV GENERATOR MODEL 92068A 4:40 PM MON., 3 DEC., 1979
0003
0004 ECHO?
0005 YES * ECHO ON
0006
0007 OUTPUT FILE NAMR?
0008 SESSY:DB:-43:4500 * OUTPUT FILE
0009
0010 SYSTEM DISC MODEL?
0011 7925 * 7925 SYSTEM DISC
0012
0013 CONTROLLER SELECT CODE?
0014 12 * CONTROLLER SELECT CODE
0015
0016 MODEL,#TRKS,FIRST CYL,HEAD,#SURFACES, UNIT,#SPARES FOR SUBCHNL:
0017 #?
0018 * DISC #TRKS 1ST-CYL HEAD #SURFACES UNIT #SPARES
0019 7925, 256, 0, 0, 9, 0, 5 *SUBCHANNEL 0
0020 01?
0021 7925, 1500, 29, 0, 9, 0, 66 *SUBCHANNEL 1
0022 02?
0023 7925, 193, 203, 0, 9, 0, 5 *SUBCHANNEL 2
0024 03?
0025 7925, 193, 225, 0, 9, 0, 5 *SUBCHANNEL 3
0026 04?
0027 7925, 193, 247, 0, 9, 0, 5 *SUBCHANNEL 4
0028 05?
0029 7925, 193, 269, 0, 9, 0, 5 *SUBCHANNEL 5
0030 06?
0031 7925, 193, 291, 0, 9, 0, 5 *SUBCHANNEL 6
0032 07?
0033 7925, 193, 313, 0, 9, 0, 5 *SUBCHANNEL 7
0034 08?
0035 7925, 193, 335, 0, 9, 0, 5 *SUBCHANNEL 8
0036 09?
0037 7925, 193, 357, 0, 9, 0, 5 *SUBCHANNEL 9
0038 10?
0039 7925, 193, 379, 0, 9, 0, 5 *SUBCHANNEL 10
0040 11?
0041 7925, 193, 401, 0, 9, 0, 5 *SUBCHANNEL 11
0042 12?
0043 7925, 256, 423, 0, 9, 0, 5 *SUBCHANNEL 12
0044 13?
0045 7925, 193, 452, 0, 9, 0, 5 *SUBCHANNEL 13
0046 14?
0047 7925, 193, 474, 0, 9, 0, 5 *SUBCHANNEL 14
0048 15?
0049 7925, 193, 496, 0, 9, 0, 5 *SUBCHANNEL 15
0050 16?
0051 7925, 193, 518, 0, 9, 0, 5 *SUBCHANNEL 16
0052 17?
0053 7925, 193, 540, 0, 9, 0, 5 *SUBCHANNEL 17
0054 18?
0055 7925, 193, 562, 0, 9, 0, 5 *SUBCHANNEL 18
0056 19?
0057 7925, 193, 584, 0, 9, 0, 5 *SUBCHANNEL 19
0058 20?

0059	7925,	193,	696,	0,	9,	0,	5	*SUBCHANNEL 20
0060	21?							
0061	7925,	193,	628,	0,	9,	0,	5	*SUBCHANNEL 21
0062	22?							
0063	7925,	193,	650,	0,	9,	0,	5	*SUBCHANNEL 22
0064	23?							
0065	7925,	193,	672,	0,	9,	0,	5	*SUBCHANNEL 23
0066	24?							
0067	7925,	96,	694,	0,	9,	0,	3	*SUBCHANNEL 24
0068	25?							
0069	7925,	150,	705,	0,	9,	0,	3	*SUBCHANNEL 25
0070	26?							
0071	7925,	96,	722,	0,	9,	0,	3	*SUBCHANNEL 26
0072	27?							
0073	7925,	96,	733,	0,	9,	0,	3	*SUBCHANNEL 27
0074	28?							
0075	7925,	194,	744,	0,	9,	0,	4	*SUBCHANNEL 28
0076	29?							
0077	7925,	194,	756,	0,	9,	0,	4	*SUBCHANNEL 29
0078	30?							
0079	7925,	194,	788,	0,	9,	0,	4	*SUBCHANNEL 30
0080	31?							
0081	7925,	114,	810,	0,	9,	0,	3	*SUBCHANNEL 31
0082								
0083	SYSTEM SUBCHNL?							
0084	0							* SYSTEM SUBCHANNEL
0085								
0086	AUX DISC (YES OR NO OR # TRKS)?							
0087	YES							* AUXILIARY DISC
0088								
0089	AUX DISC SUBCHNL?							
0090	12							* AUXILIARY DISC SUBCHANNEL
0091								
0092	TBG SELECT CODE?							
0093	10							* TBG SELECT CODE
0094								
0095	PRIV. INT. SELECT CODE?							
0096	0							* NO PRIVILEGED INT. CARD
0097								
0098	MEM. RES. ACCESS TABLE AREA II?							
0099	YES							* MEM. RES. ACCESS TABLE AREA II
0100								
0101	RT MEMORY LOCK?							
0102	YES							* RT MEMORY LOCK
0103								
0104	BG MEMORY LOCK?							
0105	YES							* BG MEMORY LOCK
0106								
0107	SWAP DELAY?							
0108	50							* SWAP DELAY
0109								
0110	MEM SIZE?							
0111	512							* MEMORY SIZE
0112								
0113	BOOT FILE NAMR?							
0114	0							* BOOT FILE NAME
0115								
0116								
0117	PROG INPUT PHASE:							
0118	-							

```

0119 *
0120 -
0121 *
0122 -
0123 *****PROGRAM INPUT PHASE*****
0124 -
0125 *
0126 -
0127 *
0128 -
0129 MAP ALL *MAP MODULES,GLOBALS,LINKS
0130 -
0131 LINKS IN CURRENT
0132 -
0133 REL,%CR4S1::SM * RTE-IVB OP SYS
0134 -
0135 REL,%CR4S2::SM * RTE-IVB OP SYS
0136 -
0137 REL,%$CNFY::SM * CONFIGURATOR EXTENSTON
0138 -
0139 REL,%WHZAT::SM * WHZAT (REV. CODE 2001 OR GREATER)
0140 -
0141 REL,%4AUTR::SM * AUTO RESTART
0142 -
0143 *
0144 -
0145 *****DRIVERS*****
0146 -
0147 *
0148 -
0149 REL,%DVR32::SM * 7905/06/20/25 DISC DRIVER
0150 -
0151 REL,%DVA32::SM * 7906H/7920H/7925H DISC DRIVER
0152 -
0153 REL,%STA32::SM * DVA32 TRACK MAP TABLE
0154 -
0155 REL,%DVR23::SM * 7970 MAG TAPE DRIVER
0156 -
0157 REL,%DVA05::SM * 264X TERMINAL DRIVER
0158 -
0159 REL,%4DP43::SM * RTE-IVB POWER FAIL
0160 -
0161 REL,%2DV37::SM * HPIB DRIVER
0162 -
0163 REL,%SRQ.P::SM * FOR HPIB
0164 -
0165 REL,%DVA12::SM * FOR 2631 LINE PRINTER
0166 -
0167 *
0168 -
0169 *****LIBRARIES*****
0170 -
0171 *
0172 -
0173 MAP OFF,MODULES
0174 -
0175 REL,%CLIB::SM * COMPILER LIBRARY
0176 -
0177 REL,%FF4,N::SM * FORTRAN-IV LIBRARY
0178 -

```

0179	REL,%RLIB1::SM	* DOS-RTE RELOC. LIBRARY
0180	-	
0181	REL,%RLIB2::SM	* DOS-RTE RELOC. LIBRARY
0182	-	
0183	REL,%RLIB3::SM	* DOS-RTE RELOC. LIBRARY
0184	-	
0185	REL,%4SYLB::SM	* SYSTEM LIBRARY
0186	-	
0187	REL,%LDRLB::SM	* LOADER LIBRARY
0188	-	
0189	REL,%DBUGR::SM	* USER DEBUG LIBRARY
0190	-	
0191	REL,%DSCLB::SM	* ICD/MAC UTILITY LIBRARY
0192	-	
0193	REL,%DKULB::SM	* ICD/MAC DISC BACKUP LIBRARY
0194	-	
0195	REL,%DECAR::SM	* DECIMAL STRING ARITHMETIC LIB
0196	-	
0197	REL,%IB4A::SM	* HPIB LIBRARY
0198	-	
0199	REL,%UTLLIB::SM	* UTIL.LIB.FOR COMPL,CLOAD,READT,WRITT
0200	-	
0201	REL,%BAMLR::SM	* BASIC CORE RESIDENT LIBRARY
0202	-	
0203	REL,%BASLB::SM	* BASIC SUBROUTINE LIBRARY
0204	-	
0205	REL,%VLIB::SM	* VIS LIBRARY
0206	-	
0207	*	
0208	-	
0209	*****	
0210	-	
0211	*	
0212	-	
0213	REL,%BMPG1::SM	* FILE MANAGER - PART 1
0214	-	
0215	REL,%BMPG2::SM	* FILE MANAGER - PART 2
0216	-	
0217	REL,%BMPG3::SM	* FILE MANAGER - PART 3
0218	-	
0219	*****	
0220	-	
0221	REL,%SMON1::SM	* SESSION MONITOR #1
0222	-	
0223	REL,%SMON2::SM	* SESSION MONITOR #2
0224	-	
0225	REL,%SP01B::SM	* SPOOLING
0226	-	
0227	REL,%SP02B::SM	* SPOOLING
0228	-	
0229	*	
0230	-	
0231	*****	
0232	-	
0233	*	
0234	-	
0235	REL,%4LDR::SM	* LOADR
0236	-	
0237	REL,%EDITR::SM	* EDITOR
0238	-	

0239 *
0240 -
0241 *****
0242 -
0243 *
0244 -
0245 REL,%LGTAT::SM * LGTAT UTILITY
0246 -
0247 *
0248 -
0249 *****PROGRAMS*****
0250 -
0251 *
0252 -
0253 REL,%LSAVE::SM * LU SAVE PROGRAM
0254 -
0255 REL,%LUSAVE::SM * UNIT SAVE PROGRAM
0256 -
0257 REL,%RESTR::SM * RESTORE PROGRAM
0258 -
0259 REL,%LCOPY::SM * COPY PROGRAM
0260 -
0261 REL,%COMPL::SM * COMPL PROGRAM
0262 -
0263 REL,%CLOAD::SM * CLOAD PROGRAM
0264 -
0265 REL,%READT::SM * READT UTILITY
0266 -
0267 REL,%WRITT::SM * WRITT UTILITY
0268 -
0269 REL,%HELP::SM * HELP UTILITY
0270 -
0271 REL,%ACCTS::SM * ACCOUNTS PROGRAM
0272 -
0273 DISPLAY UNDEFS,TR
UNDEFS
0275 86940
0276 -
0277 -
0278 -
0279 -
0280 -
0281 -
0282 -
0283 -
0284 -
0285 TR
0286 -
0287 /E
0288 UNDEFS
0289 86940
0290
0291 PARAMETERS
0292 -
0293 *
0294 *****PARAMETER INPUT PHASE*****
0295 *
0296 D,RTR,1,1
0297 -
0298 WHZAT,1,41

0299 -
0300 /E
0301
0302 CHANGE ENTS?
0303 -
0304 *
0305 *****CHANGE ENTS*****
0306 *
0307 *
0308 ***SCIENTIFIC INSTRUCTION SET***
0309 *
0310 TAN,RP,105320
0311 -
0312 SQRT,RP,105321
0313 -
0314 ALOG,RP,105322
0315 -
0316 ATAN,RP,105323
0317 -
0318 COS,RP,105324
0319 -
0320 SIN,RP,105325
0321 -
0322 EXP,RP,105326
0323 -
0324 ALOGT,RP,105327
0325 -
0326 TANH,RP,105330
0327 -
0328 DPOLY,RP,105331
0329 -
0330 /CMRT,RP,105332
0331 -
0332 /ATLG,RP,105333
0333 -
0334 .FPWR,RP,105334
0335 -
0336 .TPWR,RP,105335
0337 -
0338 *
0339 *
0340 ****DOUBLE INTEGER****
0341 *
0342 *
0343 .DAD,RP,105014
0344 -
0345 .DSB,RP,105034
0346 -
0347 .DMP,RP,105054
0348 -
0349 .DDI,RP,105074
0350 -
0351 .DSBR,RP,105114
0352 -
0353 .DDIR,RP,105134
0354 -
0355 .DNG,RP,105203
0356 -
0357 .DIN,RP,105210
0358 -

0359 .DDE,RP,105211
0360 -
0361 .DIS,RP,105212
0362 -
0363 .DDS,RP,105213
0364 -
0365 .DCO,RP,105204
0366 -
0367 *
0368 *
0369 ****FAST FORTRAN****
0370 *
0371 *
0372 DBLE,RP,105201
0373 -
0374 SNGL,RP,105202
0375 -
0376 .DFER,RP,105205
0377 -
0378 .XPAK,RP,105206
0379 -
0380 .BLE,RP,105207
0381 -
0382 .NGL,RP,105214
0383 -
0384 .XCOM,RP,105215
0385 -
0386 ..DCM,RP,105216
0387 -
0388 DDINT,RP,105217
0389 -
0390 .XFER,RP,105220
0391 -
0392 .GOTO,RP,105221
0393 -
0394 ..MAP,RP,105222
0395 -
0396 .ENTR,RP,105223
0397 -
0398 .ENTP,RP,105224
0399 -
0400 .PWR2,RP,105225
0401 -
0402 .FLUN,RP,105226
0403 -
0404 SSETP,RP,105227
0405 -
0406 .PACK,RP,105230
0407 -
0408 .CFER,RP,105231
0409 -
0410 ..FCM,RP,105232
0411 -
0412 ..TCM,RP,105233
0413 -
0414 .LBT,RP,105763
0415 -
0416 .SBT,RP,105764
0417 -
0418 .DLD,RP,104200

0419 -
0420 .DST,RP,104400
0421 -
0422 .MPY,RP,100200
0423 -
0424 .DIV,RP,100400
0425 -
0426 CLRIO,RP,2001
0427 -
0428 *
0429 *
0430 *****HFPP = TWO WORD*****
0431 *
0432 *
0433 .FAD,RP,105000
0434 -
0435 .FSB,RP,105020
0436 -
0437 .FMP,RP,105040
0438 -
0439 .FDV,RP,105060
0440 -
0441 IFIX,RP,105100
0442 -
0443 .FIXD,RP,105104
0444 -
0445 FLOAT,RP,105120
0446 -
0447 .FLTD,RP,105124
0448 -
0449 *
0450 *
0451 *****HFPP = THREE WORD*****
0452 *
0453 *
0454 .XADD,RP,105001
0455 -
0456 .XSUB,RP,105021
0457 -
0458 .XMPY,RP,105041
0459 -
0460 .XDIV,RP,105061
0461 -
0462 .XFXS,RP,105101
0463 -
0464 .DINT,RP,105101
0465 -
0466 .XFXD,RP,105105
0467 -
0468 .XFTS,RP,105121
0469 -
0470 .IDBL,RP,105121
0471 -
0472 .XFTD,RP,105125
0473 -
0474 *
0475 *
0476 *****HFPP = FOUR WORD*****
0477 *
0478 *

0479 .TADD,RP,105002
0480 -
0481 .TSUB,RP,105022
0482 -
0483 .TMPY,RP,105042
0484 -
0485 .TDIV,RP,105062
0486 -
0487 .TFXS,RP,105102
0488 -
0489 .TINT,RP,105102
0490 -
0491 .TFXD,RP,105106
0492 -
0493 .TFTS,RP,105122
0494 -
0495 .ITBL,RP,105122
0496 -
0497 .TFTD,RP,105126
0498 -
0499 *
0500 *
0501 *****EMA*****
0502 *
0503 *
0504 .EMAP,RP,105257
0505 -
0506 .EMIO,RP,105240
0507 -
0508 .MMAP,RP,105241
0509 -
0510 *
0511 *
0512 ****
0513 *
0514 *
0515 .MVW,RP,105777
0516 -
0517 .CMW,RP,105776
0518 -
0519 *
0520 *
0521 * FOUR WORD DOUBLE PRECISION
0522 *
0523 *
0524 ZSDBL,RP,4
0525 -
0526 *
0527 *
0528 *****VECT INSTRUCTION SET*****
0529 *****VECT INSTRUCTION SET*****
0530 *****VECT INSTRUCTION SET*****
0531 *
0532 *
0533 ***SINGLE PRECISION***
0534 *
0535 .VECT,RP,101460
0536 -
0537 VPIV,RP,101461
0538 -

0539 VABS,RP,101462
0540 -
0541 VSUM,RP,101463
0542 -
0543 VNRM,RP,101464
0544 -
0545 VDOT,RP,101465
0546 -
0547 VMAX,RP,101466
0548 -
0549 VMAB,RP,101467
0550 -
0551 VMIN,RP,101470
0552 -
0553 VMIB,RP,101471
0554 -
0555 VMOV,RP,101472
0556 -
0557 VSWP,RP,101473
0558 -
0559 .ERES,RP,101474
0560 -
0561 .ESEG,RP,101475
0562 -
0563 .VSET,RP,101476
0564 -
0565 *
0566 ***DOUBLE PRECISION***
0567 *
0568 .DVCT,RP,105460
0569 -
0570 DVPIV,RP,105461
0571 -
0572 DVABS,RP,105462
0573 -
0574 DVSUM,RP,105463
0575 -
0576 DVNRM,RP,105464
0577 -
0578 DVDOT,RP,105465
0579 -
0580 DVMAX,RP,105466
0581 -
0582 DVMA8,RP,105467
0583 -
0584 DVMIN,RP,105470
0585 -
0586 DVMIB,RP,105471
0587 -
0588 DVMOV,RP,105472
0589 -
0590 DVSWP,RP,105473
0591 -
0592 *
0593 *
0594 *
0595 /E
0596
0597
0598

0599 TABLE AREA I <<PAGE 00001>>
0600
0601 EQUIPMENT TABLE ENTRY
0602
0603
0604 EQT 01?
0605 *
0606 *****TABLE GENERATION PHASE*****
0607 *****
0608 *****
0609 *
0610 *****EQUIPMENT TABLE*****
0611 *
0612 11,DVR32,D * EQT 01 7925 DISC
0613
0614 EQT 02?
0615 12,DVA32,D,T=200 * EQT 02 7906H DISC
0616
0617 EQT 03?
0618 13,DVA05,B,X=13,T=12000 * EQT 03 SYSTEM CONSOLE (2645)
0619
0620 EQT 04?
0621 14,DVA12,B,X=13,T=300 * EQT 04 2631 LINE PRINTER
0622
0623 EQT 05?
0624 15,DVR37,B,X=50,T=20000 * EQT 05 HPIB
0625
0626 EQT 06?
0627 16,DVR23,B,D * EQT 06 7970 MAG TAPE
0628
0629 EQT 07?
0630 20,DVA05,B,X=13,T=12000 * EQT 07 2645 TERMINAL
0631
0632 EQT 08?
0633 21,DVA05,B,X=13,T=12000 * EQT 08 2645 TERMINAL
0634
0635 EQT 09?
0636 22,DVA05,B,X=13,T=12000 * EQT 09 2645 TERMINAL
0637
0638 EQT 10?
0639 23,DVA05,B,X=13,T=12000 * EQT 10 2645 TERMINAL
0640
0641 EQT 11?
0642 24,DVA05,B,X=13,T=12000 * EQT 11 2648 TERMINAL
0643
0644 EQT 12?
0645 25,DVA05,B,X=13,T=12000 * EQT 12 2648 TERMINAL
0646
0647 EQT 13?
0648 26,DVA05,B,X=13,T=12000 * EQT 13 2648 TERMINAL
0649
0650 EQT 14?
0651 70,DVS43,M,X=18 * EQT 14 SPOOLING
0652
0653 EQT 15?
0654 71,DVS43,M,X=18 * EQT 15 SPOOLING
0655
0656 EQT 16?
0657 72,DVS43,M,X=18 * EQT 16 SPOOLING

0659	EQT 17?	
0660	73,DVS43,M,X=18	* EQT 17 SPOOLING
0661		
0662	EQT 18?	
0663	74,DVS43,M,X=18	* EQT 18 SPOOLING
0664		
0665	EQT 19?	
0666	75,DVS43,M,X=18	* EQT 19 SPOOLING
0667		
0668	EQT 20?	
0669	76,DVS43,M,X=18	* EQT 20 SPOOLING
0670		
0671	EQT 21?	
0672	77,DVS43,M,X=18	* EQT 21 SPOOLING
0673		
0674	EQT 22?	
0675	4,DVP43,M	* EQT 22 POWER FAIL
0676		
0677	EQT 23?	
0678	/E	
0679		
0680		
0681	DEVICE REFERENCE TABLE	
0682		
0683	001 = EQT #?	
0684	*	
0685	*****DEVICE REFERENCE TABLE*****	
0686	*	
0687	3	* LU 01 SYSTEM CONSOLE
0688		
0689	002 = EQT #?	
0690	1	* LU 02 SYSTEM DISC (SUBCHANNEL 0)
0691		
0692	003 = EQT #?	
0693	1,12	* LU 03 AUX. DISC (SUBCHANNEL 12)
0694		
0695	004 = EQT #?	
0696	3,1	* LU 04 LEFT CTU
0697		
0698	005 = EQT #?	
0699	3,2	* LU 05 RIGHT CTU
0700		
0701	006 = EQT #?	
0702	4	* LU 06 2631 LINE PRINTER
0703		
0704	007 = EQT #?	
0705	5	* LU 07 HPIR
0706		
0707	008 = EQT #?	
0708	6	* LU 08 7970 MAG TAPE
0709		
0710	009 = EQT #?	
0711	1,1	* LU 09 DISC SUBCHANNEL 1
0712		
0713	010 = EQT #?	
0714	1,2	* LU 10 DISC SUBCHANNEL 2
0715		
0716	011 = EQT #?	
0717	1,3	* LU 11 DISC SUBCHANNEL 3
0718		

0719	012 = EQT #?	
0720	1,4	* LU 12 DISC SUBCHANNEL 4
0721		
0722	013 = EQT #?	
0723	1,5	* LU 13 DISC SUBCHANNEL 5
0724		
0725	014 = EQT #?	
0726	1,6	* LU 14 DISC SUBCHANNEL 6
0727		
0728	015 = EQT #?	
0729	1,7	* LU 15 DISC SUBCHANNEL 7
0730		
0731	016 = EQT #?	
0732	1,8	* LU 16 DISC SUBCHANNEL 8
0733		
0734	017 = EQT #?	
0735	1,9	* LU 17 DISC SUBCHANNEL 9
0736		
0737	018 = EQT #?	
0738	1,10	* LU 18 DISC SUBCHANNEL 10
0739		
0740	019 = EQT #?	
0741	1,11	* LU 19 DISC SUBCHANNEL 11
0742		
0743	020 = EQT #?	
0744	1,13	* LU 20 DISC SUBCHANNEL 13
0745		
0746	021 = EQT #?	
0747	1,14	* LU 21 DISC SUBCHANNEL 14
0748		
0749	022 = EQT #?	
0750	1,15	* LU 22 DISC SUBCHANNEL 15
0751		
0752	023 = EQT #?	
0753	1,16	* LU 23 DISC SUBCHANNEL 16
0754		
0755	024 = EQT #?	
0756	1,17	* LU 24 DISC SUBCHANNEL 17
0757		
0758	025 = EQT #?	
0759	1,18	* LU 25 DISC SUBCHANNEL 18
0760		
0761	026 = EQT #?	
0762	1,19	* LU 26 DISC SUBCHANNEL 19
0763		
0764	027 = EQT #?	
0765	1,20	* LU 27 DISC SUBCHANNEL 20
0766		
0767	028 = EQT #?	
0768	1,21	* LU 28 DISC SUBCHANNEL 21
0769		
0770	029 = EQT #?	
0771	1,22	* LU 29 DISC SUBCHANNEL 22
0772		
0773	030 = EQT #?	
0774	1,23	* LU 30 DISC SUBCHANNEL 23
0775		
0776	031 = EQT #?	
0777	1,24	* LU 31 DISC SUBCHANNEL 24
0778		

0779	032 = EQT #?	
0780	1,25	* LU 32 DISC SUBCHANNEL 25
0781		
0782	033 = EQT #?	
0783	1,26	* LU 33 DISC SUBCHANNEL 26
0784		
0785	034 = EQT #?	
0786	1,27	* LU 34 DISC SUBCHANNEL 27
0787		
0788	035 = EQT #?	
0789	1,28	* LU 35 DISC SUBCHANNEL 28
0790		
0791	036 = EQT #?	
0792	1,29	* LU 36 DISC SUBCHANNEL 29
0793		
0794	037 = EQT #?	
0795	1,30	* LU 37 DISC SUBCHANNEL 30
0796		
0797	038 = EQT #?	
0798	1,31	* LU 38 DISC SUBCHANNEL 31
0799		
0800	039 = EQT #?	
0801	2	* LU 39 7906H DISC SUBCH 00
0802		
0803	040 = EQT #?	
0804	2,1	* LU 40 7906H DISC SUBCH 01
0805		
0806	041 = EQT #?	
0807	2,2	* LU 41 7906H DISC SUBCH 02
0808		
0809	042 = EQT #?	
0810	2,3	* LU 42 7906H DISC SUBCH 03
0811		
0812	043 = EQT #?	
0813	2,4	* LU 43 7906H DISC SUBCH 04
0814		
0815	044 = EQT #?	
0816	2,5	* LU 44 7906H DISC SUBCH 05
0817		
0818	045 = EQT #?	
0819	2,6	* LU 45 7906H DISC SUBCH 06
0820		
0821	046 = EQT #?	
0822	2,7	* LU 46 7906H DISC SUBCH 07
0823		
0824	047 = EQT #?	
0825	2,8	* LU 47 7906H DISC SUBCH 08
0826		
0827	048 = EQT #?	
0828	2,9	* LU 48 7906H DISC SUBCH 09
0829		
0830	049 = EQT #?	
0831	22	* LU 49 POWER FAIL
0832		
0833	050 = EQT #?	
0834	7	* LU 50 2645 TERMINAL #1
0835		
0836	051 = EQT #?	
0837	8	* LU 51 2645 TERMINAL #2
0838		

0839	052 = EQT #?	
0840	9	* LU 52 2645 TERMINAL #3
0841		
0842	053 = EQT #?	
0843	10	* LU 53 2645 TERMINAL #4
0844		
0845	054 = EQT #?	
0846	11	* LU 54 2648 TERMINAL #5
0847		
0848	055 = EQT #?	
0849	12	* LU 55 2648 TERMINAL #6
0850		
0851	056 = EQT #?	
0852	13	* LU 56 2648 TERMINAL #7
0853		
0854	057 = EQT #?	
0855	7,1	* LU 57 TERMINAL #1 LEFT CTU
0856		
0857	058 = EQT #?	
0858	7,2	* LU 58 TERMINAL #1 RIGHT CTU
0859		
0860	059 = EQT #?	
0861	7,4	* LU 59 TERMINAL #1 AUX. PRINTER
0862		
0863	060 = EQT #?	
0864	8,1	* LU 60 TERMINAL #2 LEFT CTU
0865		
0866	061 = EQT #?	
0867	8,2	* LU 61 TERMINAL #2 RIGHT CTU
0868		
0869	062 = EQT #?	
0870	8,4	* LU 62 TERMINAL #2 AUX. PRINTER
0871		
0872	063 = EQT #?	
0873	9,1	* LU 63 TERMINAL #3 LEFT CTU
0874		
0875	064 = EQT #?	
0876	9,2	* LU 64 TERMINAL #3 RIGHT CTU
0877		
0878	065 = EQT #?	
0879	9,4	* LU 65 TERMINAL #3 AUX. PRINTER
0880		
0881	066 = EQT #?	
0882	10,1	* LU 66 TERMINAL #4 LEFT CTU
0883		
0884	067 = EQT #?	
0885	10,2	* LU 67 TERMINAL #4 RIGHT CTU
0886		
0887	068 = EQT #?	
0888	10,4	* LU 68 TERMINAL #4 AUX. PRINTER
0889		
0890	069 = EQT #?	
0891	11,1	* LU 69 TERMINAL #5 LEFT CTU
0892		
0893	070 = EQT #?	
0894	11,2	* LU 70 TERMINAL #5 RIGHT CTU
0895		
0896	071 = EQT #?	
0897	11,3	* LU 71 TERMINAL #5 GRAPHICS
0898		

0899	072 = EQT #?	
0900	11,4	* LU 72 TERMINAL #5 AUX. PRINTER
0901		
0902	073 = EQT #?	
0903	12,1	* LU 73 TERMINAL #6 LEFT CTU
0904		
0905	074 = EQT #?	
0906	12,2	* LU 74 TERMINAL #6 RIGHT CTU
0907		
0908	075 = EQT #?	
0909	12,3	* LU 75 TERMINAL #6 GRAPHICS
0910		
0911	076 = EQT #?	
0912	12,4	* LU 76 TERMINAL #6 AUX. PRINTER
0913		
0914	077 = EQT #?	
0915	13,1	* LU 77 TERMINAL #7 LEFT CTU
0916		
0917	078 = EQT #?	
0918	13,2	* LU 78 TERMINAL #7 RIGHT CTU
0919		
0920	079 = EQT #?	
0921	13,3	* LU 79 TERMINAL #7 GRAPHICS
0922		
0923	080 = EQT #?	
0924	13,4	* LU 80 TERMINAL #7 AUX. PRINTER
0925		
0926	081 = EQT #?	
0927	14	* LU 81 SPOOLING
0928		
0929	082 = EQT #?	
0930	15	* LU 82 SPOOLING
0931		
0932	083 = EQT #?	
0933	16	* LU 83 SPOOLING
0934		
0935	084 = EQT #?	
0936	17	* LU 84 SPOOLING
0937		
0938	085 = EQT #?	
0939	18	* LU 85 SPOOLING
0940		
0941	086 = EQT #?	
0942	19	* LU 86 SPOOLING
0943		
0944	087 = EQT #?	
0945	20	* LU 87 SPOOLING
0946		
0947	088 = EQT #?	
0948	21	* LU 88 SPOOLING
0949		
0950	089 = EQT #?	
0951	/E	
0952		
0953		
0954	INTERRUPT TABLE	
0955	=	
0956	*	
0957	***** INTERRUPT TABLE *****	
0958		

0959	*	
0960	4,ENT,SPOWR	* POWER FAIL
0961	-	
0962	11,EQT,1	* 7925 DISC
0963	-	
0964	12,EQT,2	* 7906H DISC
0965	-	
0966	13,EQT,3	* SYSTEM CONSOLE
0967	-	
0968	14,EQT,4	* 2631 LINE PRINTER
0969	-	
0970	15,EQT,5	* HPIR
0971	-	
0972	16,EQT,6	* 7970 MAG TAPE
0973	-	
0974	17,EQT,6	* 7970 MAG TAPE
0975	-	
0976	20,PRG,PRMPT	* TERMINAL #1
0977	-	
0978	21,PRG,PRMPT	* TERMINAL #2
0979	-	
0980	22,PRG,PRMPT	* TERMINAL #3
0981	-	
0982	23,PRG,PRMPT	* TERMINAL #4
0983	-	
0984	24,PRG,PRMPT	* TERMINAL #5
0985	-	
0986	25,PRG,PRMPT	* TERMINAL #6
0987	-	
0988	26,PRG,PRMPT	* TERMINAL #7
0989	-	
0990	70,EQT,14	* SPOOLING
0991	-	
0992	71,EQT,15	* SPOOLING
0993	-	
0994	72,EQT,16	* SPOOLING
0995	-	
0996	73,EQT,17	* SPOOLING
0997	-	
0998	74,EQT,18	* SPOOLING
0999	-	
1000	75,EQT,19	* SPOOLING
1001	-	
1002	76,EQT,20	* SPOOLING
1003	-	
1004	77,EQT,21	* SPOOLING
1005	-	
1006	/E	
1007		
1008		
1009	TABLE AREA I MODULES	
1010		
1011	\$STB1(0099)04070 04231 92067-16103 REV.2001 790911	
1012	*SERAB 04100	
1013	*SPVCN 04102	
1014	*EXEC 04072	
1015	*XLUEX 04075	
1016	*\$LIBR 04104	
1017	*SLIBX 04111	
1018	*SPVST 04103	

1019 *SUPIO 04116
 1020 *SYCIC 04120
 1021 *SYCIC 04122
 1022 *SCIC 04124
 1023 *SWIN 04126
 1024 *SUCON 04133
 1025 *\$XEQ 04145
 1026 *\$XDMP 04147
 1027 *\$IDLE 04154
 1028 *SSCD3 04163
 1029 *\$IDNO 04167
 1030 *\$MEU 04200
 1031 *SLIST 04157
 1032 *\$MESS 04173
 1033 *\$WORK 04201
 1034 *\$SOP 04202
 1035 *\$ULLU 04203
 1036 *\$CGRN 04207
 1037 *\$MTM 04213
 1038 *\$OPSY 04214
 1039 *\$DATC 04215
 1040 *\$CL1 04227
 1041 *\$CL2 04230
 1042 *\$CPU 04231
 1043 *\$CMAD 04221
 1044 *\$ACFL 04222
 1045 *\$LGON 04223
 1046 *\$LGOF 04224
 1047 *\$STH 04225
 1048 *\$LMES 04226
 1049 *\$DSCS 04216
 1050 *\$SHED 04220
 1051 BP LINKAGE 01643
 1052
 1053 \$BITM(0099) 04232 04240 92567-16103 REV.1903 790420
 1054 *\$BITM 04232
 1055 BP LINKAGE 01643
 1056
 1057 \$MCN(0099) 04241 04254 92067-16103 REV.1903 790213
 1058 *\$SMLK 04241
 1059 *\$SMLN 04242
 1060 *\$SMEX 04243
 1061 *\$SMCA 04246
 1062 *\$SMER 04247
 1063 *\$SMCP 04250
 1064 *\$SMID 04251
 1065 *\$SMGP 04252
 1066 *\$SMST 04254
 1067 *\$SMDL 04253
 1068 *\$SMII 04244
 1069 *\$SMDS 04245
 1070 BP LINKAGE 01643
 1071
 1072 STA32(0099) 04255 04464 92067-16507 REV.2001 791015 AUX TRACK MAP TABLE
 1073 *STA32 04255
 1074 BP LINKAGE 01643
 1075
 1076
 1077 DRIVR PART 00002
 1078 CHANGE DRIVR PART?

1079 *
1080 *****SYSTEM BOUNDARIES
1081 *
1082 *
1083 * CHANGE DRIVER PART
1084
1085 DP 01 <<PAGE 00003>>:
1086
1087 DVR32(0099)06007 10076 92067-16330 REV.2001 791029
1088 *I.32 07226
1089 *C.32 06223
1090 BP LINKAGE 01637
1091
1092 DVR23(0099)10102 11015 92202-16001 REV.1913 - 790202
1093 *I.23 10102
1094 *C.23 10761
1095 BP LINKAGE 01637
1096
1097 DVA12(0099)11016 11716 92001-16020 780511 REV 1826
1098 *IA12 11016
1099 *CA12 11233
1100 BP LINKAGE 01637
1101
1102
1103
1104 SUBSYSTEM GLOBAL AREA <<PAGE 00005>>:
1105
1106 (NONE)
1107
1108
1109 RT COMMON 00000
1110 CHANGE RT COMMON ?
1111 100 * CHANGE RT COMMON
1112 RT COM ADD 12000
1113
1114
1115 BG COMMON 00924
1116 CHANGE BG COMMON ?
1117 1 * CHANGE BG COMMON
1118 BG COM ADD 12144
1119 BG COMMON 01948
1120
1121
1122 SYSTEM DRIVER AREA <<PAGE 00007>>:
1123
1124 DVP43(0099)16000 16637 92067-16004 REV.1926 790506
1125 *SPOWR 16000
1126 *IP43 16602
1127 *CP43 16475
1128 BP LINKAGE 01632
1129
1130 DVS43(0099)16660 21644 92067-16350 REV.1903 790319
1131
1132
1133
1134 TABLE AREA II <<PAGE 00008>>:
1135
1136 # OF I/O CLASSES?
1137 *
1138 *****RESOURCES TABLES

1139	*	
1140	64	* * I/O CLASSES
1141		
1142	# OF LU MAPPINGS?	
1143	10	* LU MAPPINGS
1144		
1145	# OF RESOURCE NUMBERS?	
1146	32	* * R.N.'S
1147		
1148	BUFFER LIMITS (LOW, HIGH)?	
1149	100,400	* BUFFER LIMITS
1150		
1151	0030 LONG ID SEGMENTS USED	
1152	# OF BLANK LONG ID SEGMENTS?	
1153	32	* ADDITIONAL BLANK ID SEGS
1154		
1155	0018 SHORT ID SEGMENTS USED	
1156	# OF BLANK SHORT ID SEGMENTS?	
1157	50	* ADDITIONAL SHORT ID SEGS
1158		
1159	0000 ID EXTENSIONS USED	
1160	# OF BLANK ID EXTENSIONS?	
1161	4	* ADDITIONAL ID EXTENSIONS
1162		
1163	MAXIMUM # OF PARTITIONS?	
1164	32	* PARTITIONS
1165		
1166		
1167	TABLE AREA II MODULES	
1168		
1169	\$STB2(0099) 31072 31176 92067-16103 REV.2001 791016	
1170	*\$MATA 31072	
1171	*\$MCNN 31073	
1172	*\$MBGP 31074	
1173	*\$MRTP 31075	
1174	*\$DLTH 31076	
1175	*\$DVPT 31077	
1176	*\$TIME 31100	
1177	*\$BATH 31103	
1178	*\$DLP 31105	
1179	*\$PLP 31106	
1180	*\$SSCT 31125	
1181	*\$STRK 31124	
1182	*\$ENDS 31107	
1183	*\$MPFT 31112	
1184	*\$BGFR 31113	
1185	*\$RTFR 31114	
1186	*\$IDEX 31115	
1187	*\$MRMP 31116	
1188	*\$MPS2 31120	
1189	*\$EMRP 31132	
1190	*\$MPSA 31117	
1191	*\$SDA 31121	
1192	*\$SDT2 31122	
1193	*\$CMST 31123	
1194	*\$COML 31126	
1195	*\$CFR 31127	
1196	*\$MNP 31130	
1197	*\$DVMP 31131	
1198	*\$RLB 31133	

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1199      *$RLN    31134
1200      *$SBTB   31135
1201      *$OTAT   31110
1202      *$OPRI   31111
1203      *$SPCR   31143
1204      *$ELTB   31144
1205      *$PNTI   31154
1206      *$MAXI   31155
1207      *$SALI   31156
1208      *$SRTI   31157
1209      *$CES    31175
1210      *$LMES   31162
1211      *$SMEM   31160
1212      BP LINKAGE 01630
1213
1214      $OSAM(0099) 31177 31233  92067-16103 REV.2001 791016
1215          *$OSAM  31177
1216          *$BRTX  31224
1217      BP LINKAGE 01630
1218
1219      SSPCL(0099) 31234 31236  92067-16350 REV.1903 780921
1220
1221
1222
1223      SYSTEM <<PAGE 00012>>;
1224
1225      SCSY4(0099) 31237 31236  92067-16102 REV.2001 791020
1226      BP LINKAGE 00100
1227
1228      DISP4(0099) 31313 37042  92067-16102 REV.2001 790508
1229          *$RENT   32140
1230          *$BRED   36543
1231          *$ZZZZ   36643
1232          *$XCQ    31601
1233          *$RVAL   32211
1234          *$DCPU   32212
1235          *$SLICE   32216
1236          *$ALDM   34145
1237          *$DMAL   34150
1238          *$SMAP   32300
1239          *$PRCN   34174
1240          *$XDM    32444
1241          *$MAXP   31432
1242          *$UNPE   34247
1243          *$BG1    34225
1244          *$BG2    34226
1245          *$BG3    34227
1246          *$BG4    34230
1247          *$BG5    34231
1248          *$RT1    34232
1249          *$RT2    34233
1250          *$RT3    34234
1251          *$RT4    34235
1252          *$RT5    34236
1253          *$MM1    34237
1254          *$MM2    34240
1255          *$MM3    34241
1256          *$MM4    34242
1257          *$MM5    34243
1258      BP LINKAGE 00333

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1259
 1260 RTIME(0099) 37100 37740 92067-16102 REV.1903 780822
 1261 *\$TADD 37540
 1262 *\$CLOCK 37100
 1263 *\$TREM 37662
 1264 *\$TIMV 37401
 1265 *\$ETTH 37605
 1266 *\$TIMR 37474
 1267 *\$ONTM 37446
 1268 *\$TMRO 37710
 1269 *\$SCLK 37352
 1270 BP LINKAGE 00342
 1271
 1272 SASC4(0099) 37741 40033 92067-16102 REV.1903 780125
 1273 *\$OPER 37771
 1274 *\$ERIN 40011
 1275 *\$NOPG 40001
 1276 *\$ILST 37741
 1277 *\$NOLG 37752
 1278 *\$LGBS 37762
 1279 *\$NMEM 40021
 1280 BP LINKAGE 00342
 1281
 1282 RTI04(0099) 40152 46630 92067-16102 REV.2001 791020
 1283 *\$CICA 40152
 1284 *\$XSIO 43301
 1285 *\$SYMG 45405
 1286 *\$TORQ 40453
 1287 *\$I0UP 45175
 1288 *\$I0DN 45070
 1289 *\$ETEQ 45656
 1290 *\$IRT 40363
 1291 *\$DEVT 45003
 1292 *\$CXCC 40263
 1293 *\$CYC 40264
 1294 *\$BFOT 45437
 1295 *\$YMG 45321
 1296 *\$GTIO 42011
 1297 *\$UP 45176
 1298 *\$CVEQ 45635
 1299 *\$DMS 40254
 1300 *\$BLLO 40446
 1301 *\$BLUP 40447
 1302 *\$BITB 44005
 1303 *\$UNLK 44655
 1304 *\$XXUP 45242
 1305 *\$DLAY 44765
 1306 *\$DMEQ 41206
 1307 *\$CKLO 43557
 1308 *\$CON1 43423
 1309 *\$CON2 40332
 1310 *\$CON3 40305
 1311 *\$DRVW 43004
 1312 *\$RSM 42774
 1313 *\$PSTE 45612
 1314 *\$LU?? 45563
 1315 *\$DVC 40165
 1316 *\$CJMP 40220
 1317 *\$LIA4 40443
 1318 *\$EQCL 46456

1319 *\$IOCL 45715
 1320 BP LINKAGE 00522
 1321
 1322 EXEC4(0099)46651 51301 92067-16102 REV.2001 790917
 1323 *\$ERMG 51104
 1324 *\$RQST 46651
 1325 *\$OTRL 50265
 1326 *\$USER 51107
 1327 *\$DREQ 50317
 1328 *\$DREL 50414
 1329 *\$SDRL 50272
 1330 *\$SDSK 50432
 1331 *\$ERRA 50260
 1332 *\$REIO 47451
 1333 *\$CREL 50160
 1334 *\$RSRSE 47526
 1335 *\$ABRE 47613
 1336 *\$ABXY 50773
 1337 *\$CALL 46747
 1338 *\$PWRS 46752
 1339 *\$MVBF 47525
 1340 *\$SGAF 46741
 1341 *\$LEND 46740
 1342 *\$DHED 47442
 1343 *\$LBR 47133
 1344 *\$LBX 47714
 1345 *\$SEX 50721
 1346 *\$EX4 51235
 1347 *\$EX5 51236
 1348 *\$EX8 51241
 1349 *\$EX15 51250
 1350 *\$EX16 51251
 1351 BP LINKAGE 00546
 1352
 1353 STRN4(0099)51337 51511 92067-16103 REV.1903 780104
 1354 *\$TRRN 51337
 1355 *\$CRN# 51403
 1356 *\$ULID 51430
 1357 BP LINKAGE 00553
 1358
 1359 SCHD4(0099)51534 57506 92067-16103 REV.2001 791009
 1360 *\$ABRT 56273
 1361 *\$TYPE 55621
 1362 *\$PRSE 52545
 1363 *\$CNV1 55446
 1364 *\$CNV3 55402
 1365 *\$OP 53625
 1366 *\$MPT1 56345
 1367 *\$MPT2 56522
 1368 *\$MPT3 56535
 1369 *\$MPT4 56634
 1370 *\$MPT5 56660
 1371 *\$MPT6 56743
 1372 *\$STRT 53504
 1373 *\$INER 54244
 1374 *\$MPT7 57023
 1375 *\$ASTM 52464
 1376 *\$WATR 56512
 1377 *\$SZIT 55452
 1378 *\$MPT8 57204

1379	*\$IDSM	54316
1380	*\$PBUF	53542
1381	*\$MPT9	57237
1382	*\$RTST	57434
1383	*\$CVWD	57542
1384	*\$STRG	57427
1385	*\$MSEX	52437
1386	*\$LSTM	52040
1387	*\$RLNK	52351
1388	*\$SVAL	55144
1389	*\$SPRI	55143
1390	*\$LST	51603
1391	*\$SCD	56606
1392	*\$ID#	57005
1393	*\$MSG	52363
1394	*\$SCXX	56703
1395	*\$BRKP	55722
1396	BP LINKAGE	01040
1397		
1398	\$ALC (0099) 57533	57740 92067-16103 REV.1903 780511
1399	*\$ALC	57533
1400	*\$RTN	57624
1401	*\$PNTR	57727
1402	*\$MAXE	57737
1403	BP LINKAGE	01042
1404		
1405	OCMD4(0099) 57744	61114 92067-16103 REV.1903 780304
1406	*\$LUPR	60035
1407	*\$EQST	57744
1408	*\$CHTO	61021
1409	BP LINKAGE	01063
1410		
1411	PERR4(0099) 61137	62133 92067-16103 REV.1903 790102
1412	*\$PERR	61137
1413	*\$PETB	61514
1414	BP LINKAGE	01065
1415		
1416	SCLIB(0099) 62143	62142 92067-12001 REV.1926 790425 SCLIB
1417		
1418	FF4,A(0099) 62143	62142 24998-16002 REV.1926 790516
1419		
1420	RLIB1(0099) 62143	62142 24998-16001 REV.1926 790501
1421		
1422	RLIB2(0099) 62143	62142 24998-16009 REV.1926 790501
1423		
1424	RLIB3(0099) 62143	62142 24998-16011 REV.1926 790501
1425		
1426	SYSLB(0099) 62143	62142 92067-16268 REV.2001 791015
1427		
1428	LDRLB(0099) 62143	62142 92067-16470 REV.2001 791016
1429		
1430	DSCLB(0099) 62143	62142 92067-16332 REV.2001 791016
1431		
1432	DKULB(0099) 62143	62142 92067-16349 REV.2001 791016
1433		
1434	UTLIB(0099) 62143	62142 92067-16104 REV.1903 790203 X
1435		
1436	\$BALB(0099) 62143	62142 92067-16125 REV.2001 790924
1437		
1438	SMON1(0099) 62143	62142 92067-16260 REV.1940 790729

1439
 1440 \$MON2(0099) 62143 62142 92067-16261 REV.1940 790729
 1441
 1442 \$SALC(0099) 62143 62403 92067-16261 REV.2001 791016
 1443
 1444 \$CMND(0099) 62404 62540 92067-16261 REV.1940 790729
 1445
 1446 \$CNFG(0099) 62566 67570 92067-16103 REV.2001 791031
 1447 *\$CNFG 63077
 1448 *\$SEXIT 65313
 1449 *\$SPCHN 67530
 1450 *\$SWRRD 66551
 1451 *\$SUSRS 65651
 1452 *\$SABDP 64266
 1453 *\$SSMTB 65274
 1454 *\$STRTB 67237
 1455 *\$STREN 67210
 1456 *\$SNPGQ 64732
 1457 *\$SGDPG 67476
 1458 *\$SAVE 62566
 1459 BP LINKAGE 01252
 1460
 1461
 1462 PARTITION DRIVERS
 1463
 1464 DP 02 <<PAGE 00028>>:
 1465
 1466 DVA32(0099) 06005 10313 92067-16331 REV.2001 790830
 1467 *IA32 06005
 1468 *CIA32 07147
 1469 BP LINKAGE 01570
 1470
 1471 DP 03 <<PAGE 00030>>:
 1472
 1473 DVA05(0099) 06102 11164 92001-16035 REV. CODE 1913 9-28-78
 1474 *IA05 06102
 1475 *CIA05 06200
 1476 BP LINKAGE 01567
 1477
 1478 DP 04 <<PAGE 00032>>:
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 1480 DVR37(0099) 06122 10633 59310-16003 REV.1940 790724 EQTX=18+7*D
 1481 *I.37 06122
 1482 *C.37 06706
 1483 BP LINKAGE 01557
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 1486 MEMORY RESIDENT LIBRARY <<PAGE 00035>>:
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 1488 TRAP) 32000 33036 92101-16010 770208
 1489 TMVAL 33037 33124 92067-16268 REV.1913 790124
 1490 PRTN 33125 33237 92067-16268 REV.1903 771005
 1491 SSMVE 33240 33326 92067-16268 REV.1903 790202
 1492 IDGET 33327 33411 92067-16268 REV.1903 790314
 1493 LURQ 33417 34031 92067-16268 REV.2001 791024
 1494 SALRN 34034 34151 92067-16268 REV.1903 770715
 1495 LUTRU 34152 34260 92067-16268 REV.1903 790223
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 1498 MEMORY RESIDENTS <<PAGE 00037>>:

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 1500 WHZAT(0041) 36040 42467 92067-16501 REV.2001 791026
 1501 BP LINKAGE 00135
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 1503 SRQ.P(0030) 42507 42555 50310-16005 REV 1805 780110
 1504 BP LINKAGE 00137
 1505 RMPAR 42556 42620 781106 24998-16001
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 1507 TTYEV(0002) 42623 42632 29102-60013
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 1509 D.RTR(0001) 42635 62455 92067-16124 REV.2001 791026
 1510 P.PAS 62521 62547 92067-16125 REV.1903 740801
 1511 GTSCB 62550 62705 92067-16125 REV.1903 790709
 1512 SESSN 62706 62723 92067-16125 REV.1903 780413
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 1514 PRMPT(0005) 62726 63444 92067-16260 REV.1940 790801
 1515 FNDLU 63445 63606 92067-16268 REV.1903 780403
 1516 LUSES 63607 63640 92067-16268 REV.1903 790122
 1517 .SETB 63641 63715 92067-16268 REV.1903 780921
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 1519 SYCOM(0010) 63726 64116 92067-16260 REV.1903 781201
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 1521 EXTND(0010) 64122 64302 92067-16350 REV.1903 781030
 1522 RMPAR 64303 64345 781106 24998-16001
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 1524 SPOUT(0011) 64350 65534 92067-16350 REV.1903 790706
 1525 .DRCT 65535 65543 92067-16268 REV.1903 741120
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 1529 RT DISC RESIDENTS
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 1531 AUTOR(0001) 32042 32471 92067-16118 REV.1903 790318
 1532 *AUTOR 32110
 1533 BP LINKAGE 00004
 1534 ICONV 32472 32526
 1535 *ICONV 32474
 1536 BP LINKAGE 00005
 1537 IGET 32527 32535 750701 24998-16001
 1538 MOD 32536 32565 751101 24998-16001
 1539 PAUSE 32566 32666 771122 24998-16001
 1540 PAU.E 32667 32667 750701 24998-16001
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 1542 REIO 32736 33062 92067-16268 REV.1903 790316
 1543 TMVAL 33063 33150 92067-16268 REV.1913 790124
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 1545 SMP (0030) 32042 36714 92067-16350 REV.1940 790802
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 1551 REIO 37462 37606 92067-16268 REV.1903 790316
 1552 SCVT3 37607 37674 92067-16268 REV.1903 770621
 1553 DTACH 37675 37755 92067-16268 REV.1903 781202
 1554 LUTRU 37760 40066 92067-16268 REV.1903 790223
 1555 \$SMVE 40074 40162 92067-16268 REV.1903 790202
 1556 READF 40163 41153 92067-16125 REV.2001 791015
 1557 POST 41154 41202 92067-16125 REV.1903 740801
 1558 P.PAS 41203 41231 92067-16125 REV.1903 740801

1559	RWSUB	41232	41577	92067-16125	REV.1903	781003
1560	RWNDS	41600	41722	92067-16125	REV.1903	780801
1561	R/W\$	41724	42062	92067-16125	REV.1903	781214
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1563	.CACT	42107	42136	92067-16125	REV.1903	780921
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1565	JOB (0030)	32042	35156	92067-16350	REV. 1903	790529
1566	NAMR	35157	35453	750701	24998-16001	
1567	RMPAR	35454	35516	781106	24998-16001	
1568	RNRQ	35517	35760	92067-16268	REV.1903	780222
1569	LURQ	35761	36373	92067-16268	REV.2001	791024
1570	SALRN	36375	36512	92067-16268	REV.1903	770715
1571	.DRCT	36513	36521	92067-16268	REV.1903	741120
1572	REIO	36522	36646	92067-16268	REV.1903	790316
1573	IFTTY	36647	36734	92067-16268	REV.1903	790118
1574	LOGLU	36735	37012	92067-16268	REV.1903	790228
1575	LUTRU	37013	37121	92067-16268	REV.1903	790223
1576	KHAR	37122	37270	92067-16268	REV.1903	770525
1577	OPEN	37271	37633	92067-16125	REV.2001	791018
1578	SSMVE	37634	37722	92067-16268	REV.1903	790202
1579	READF	37725	40715	92067-16125	REV.2001	791015
1580	CLOSE	40732	41145	92067-16125	REV.2001	791019
1581	POST	41146	41174	92067-16125	REV.1903	740801
1582	SOPEN	41175	41351	92067-16125	REV.1903	790103
1583	P.PAS	41352	41400	92067-16125	REV.1903	740801
1584	RWSUB	41401	41746	92067-16125	REV.1903	781003
1585	RWNDS	41752	42074	92067-16125	REV.1903	780801
1586	R/W\$	42101	42237	92067-16125	REV.1903	781214
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1588	OVRD.	42324	42324	92067-16125	REV.1903	780526
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1590	.CACT	42343	42372	92067-16125	REV.1903	780921
1591	.UACT	42373	42474	92067-16125	REV.1903	790129
1592	.CLGN	42475	42575	92067-16125	REV.1903	780928
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1596	BG DISC RESIDENTS					
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1601	SCVT3	36062	36147	92067-16268	REV.1903	770621
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1603	FMGR (0099)	32042	33023	92067-16185	REV.1903	790403
1604	FM.CM	33024	35220	92067-16185	REV.2001	791022
1605	LURQ	35353	35765	92067-16268	REV.2001	791024
1606	SALRN	35767	36104	92067-16268	REV.1903	770715
1607	.DRCT	36106	36114	92067-16268	REV.1903	741120
1608	IFBRK	36115	36150	92067-16268	REV.1913	790124
1609	IFTTY	36151	36236	92067-16268	REV.1903	790118
1610	LUTRU	36237	36345	92067-16268	REV.1903	790223
1611	PTERR	36346	36402	92067-16268	REV.1903	781013
1612	SSMVE	36403	36471	92067-16268	REV.1903	790202
1613	OPEN	36472	37034	92067-16125	REV.2001	791018
1614	RMPAR	37035	37077	781106	24998-16001	
1615	CLOSE	37100	37313	92067-16125	REV.2001	791019
1616	SOPEN	37314	37470	92067-16125	REV.1903	790103
1617	RWNDS	37471	37613	92067-16125	REV.1903	780801
1618	R/W\$	37614	37752	92067-16125	REV.1903	781214

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1625	ST.DU	41727	43407	92067-16185	REV.1903	790314
1626	CO..	43447	44233	92067-16185	REV.1903	790302
1627	CREAT	44312	44656	92067-16125	REV.1903	790224
1628	READF	44657	45647	92067-16125	REV.2001	791015
1629	REIO	45650	45774	92067-16268	REV.1903	790316
1630	RWNDF	45775	46061	92067-16125	REV.1903	780724
1631	LOCF	46065	46365	92067-16125	REV.1903	781110
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1633	P.PAS	46463	46511	92067-16125	REV.1903	740801
1634	RWSUB	46512	47057	92067-16125	REV.1903	781003
1635	LOCK.	47060	47132	92067-16125	REV.1903	781115
1636	FM.UT	47133	50744	92067-16125	REV.1903	790515
1637	CK.SM	50777	51122	92067-16125	REV.1903	771205
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1639	FMGR1(0099)	37772	40120	92067-16185	REV.1903	760929
1640	.PARS	40121	41761	92067-16185	REV.2001	791022
1641	CNUMD	41762	42001	92067-16268	REV.1903	770621
1642	SCVT3	42003	42070	92067-16268	REV.1903	770621
1643	CAPCK	42071	42415	92067-16268	REV.1940	790801
1644	IDGET	42416	42500	92067-16268	REV.1903	790314
1645	SESTB	42501	42515	92067-16268	REV.1903	790202
1646	C.TAB	42516	42722	92067-16185	REV.1903	790207
1647	CA..	42723	43144	92067-16185	REV.1903	760513
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1649	EE..	43373	44015	92067-16185	REV.1903	790206
1650	.SETB	44021	44075	92067-16268	REV.1903	780921
1651	TR..	44076	44401	92067-16185	REV.1903	790403
1652	MR..	44402	44644	92067-16185	REV.1903	760621
1653	SE..	44645	45031	92067-16185	REV.1903	740927
1654	IF..	45032	45261	92067-16185	REV.2001	791015
1655	AB..	45262	45514	92067-16185	REV.1903	790119
1656	DP..	45515	45562	92067-16185	REV.1903	760511
1657	READF	45604	46574	92067-16125	REV.2001	791015
1658	REIO	46523	46747	92067-16268	REV.1903	790316
1659	POSNT	46750	47310	92067-16125	REV.1903	790316
1660	P.PAS	47311	47337	92067-16125	REV.1903	740801
1661	RWSUB	47340	47705	92067-16125	REV.1903	781003
1662	WRLG.	47715	50064	92067-16125	REV.1903	760622
1663	CK.SM	50067	50212	92067-16125	REV.1903	771205
1664	SM.BF	50213	50436	92067-16125	REV.1903	781229
1665	GTSCB	50437	50574	92067-16125	REV.1903	790709
1666	MESSS	50575	51130	92067-16261	REV.1903	790420
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1670	IN.IT	40002	42126	92067-16185	REV.2001	790802
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1673	LOGLU	42454	42531	92067-16268	REV.1903	790228
1674	INPUT	42532	42550	92067-16268	REV.1903	780731
1675	IN..	42554	45045	92067-16185	REV.2001	790802
1676	PU..	45210	45537	92067-16185	REV.1903	790319
1677	PURGE	45541	46031	92067-16125	REV.2001	790924
1678	NAM..	46032	46126	92067-16125	REV.1903	740801

1679	J.PUT	46127	46153	92067-16125	REV.1903	740801
1680	INPUT	46154	46174	92067-16125	REV.1903	740801
1681	FIO.	46175	46316	92067-16125	REV.1903	780515
1682	FD.CK	46317	46476	92067-16125	REV.1940	790802
1683	MSC.	46477	46540	92067-16125	REV.2001	790802
1684	LOCK.	46541	46613	92067-16125	REV.1903	781115
1685	FM.UT	46620	50431	92067-16125	REV.1903	790515
1686	ICAPS	50507	50533	92067-16125	RFV.1903	781213
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1690	F.SET	41747	42137	92067-16185	REV.1903	760719
1691	CS..	42143	42374	92067-16185	REV.1903	790406
1692	READF	42375	43365	92067-16125	REV.2001	791015
1693	REIO	43366	43512	92067-16268	REV.1903	790316
1694	FSTAT	43532	44112	92067-16125	REV.1903	790118
1695	LOCF	44114	44414	92067-16125	REV.1903	781110
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1697	P.PAS	44512	44540	92067-16125	REV.1903	740801
1698	RWSUB	44541	45106	92067-16125	REV.1903	781003
1699	MSC.	45107	45150	92067-16125	REV.2001	790802
1700	LOCK.	45151	45223	92067-16125	REV.1903	781115
1701	FM.UT	45224	47035	92067-16125	REV.1903	790515
1702	LULU.	47036	47131	92067-16125	REV.1903	780915
1703	SM.BF	47132	47355	92067-16125	REV.1903	781229
1704	CL.BF	47356	47755	92067-16125	REV.1903	780714
1705	UT.BF	47756	50355	92067-16125	REV.1903	780714
1706	GTSCB	50356	50513	92067-16125	REV.1903	790709
1707						
1708	FMGR4(0099)	37772	40004	92067-16185	REV.1903	790207
1709	MC..	40005	40237	92067-16185	REV.1903	790402
1710	RC..	40240	40525	92067-16185	REV.1903	790314
1711	CNUMD	40526	40545	92067-16268	REV.1903	770621
1712	SCVT3	40546	40633	92067-16268	REV.1903	770621
1713	AC..	40634	41032	92067-16185	REV.1903	790129
1714	MS..	41033	41343	92067-16185	REV.1903	780907
1715	PRTN	41344	41456	92067-16268	REV.1903	771005
1716	IDGET	41457	41541	92067-16268	REV.1903	790314
1717	F.UTM	41544	42037	92067-16185	REV.1940	790725
1718	READF	42051	43041	92067-16125	REV.2001	791015
1719	REIO	43042	43166	92067-16268	REV.1903	790316
1720	NAM..	43167	43263	92067-16125	REV.1903	740801
1721	P.PAS	43264	43312	92067-16125	REV.1903	740801
1722	RWSUB	43313	43660	92067-16125	REV.1903	781003
1723	INPUT	43661	43701	92067-16125	REV.1903	740801
1724	WRISS	43702	43740	92067-16125	REV.1903	740801
1725	%WRIS	43744	44341	750701	24998-16001	
1726	DCMC	44373	46607	92067-16125	REV.2001	791016
1727	FD.CK	46676	47055	92067-16125	REV.1940	790802
1728	SM.BF	47056	47301	92067-16125	REV.1903	781229
1729	CL.BF	47302	47701	92067-16125	REV.1903	780714
1730	GTSCB	47711	50046	92067-16125	REV.1903	790709
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1732	FMGR5(0099)	37772	40007	92067-16185	REV.1903	781211
1733	RU..	40010	40742	92067-16185	REV.1903	790128
1734	IDGET	40743	41025	92067-16268	REV.1903	790314
1735	RP..	41026	41175	92067-16185	REV.1903	790510
1736	.RENM	41176	41321	92067-16185	REV.1903	780630
1737	IDDUP	41334	42061	92067-16185	REV.1903	790122
1738	.DWNR	42064	42131	92067-16268	REV.1903	780919

1739	IDRPL	42132	43107	92067-16185	REV.2001	791016
1740	IDRPD	43110	43457	92067-16185	REV.1903	781002
1741	OPMES	43460	43663	92067-16185	REV.1903	781229
1742	TL..	43664	43703	92067-16185	REV.1903	740801
1743	HE..	43704	43735	92067-16185	REV.1903	781012
1744	WH..	43736	44020	92067-16185	REV.1903	781101
1745	CT..	44027	44421	92067-16185	REV.1903	790226
1746	NAMR	44422	44716	750701	24998-16001	
1747	.SETB	44717	44773	92067-16268	REV.1903	780921
1748	OPENF	44774	45332	92067-16125	REV.1940	790724
1749	READF	45362	46352	92067-16125	REV.2001	791015
1750	REIO	46371	46515	92067-16268	REV.1903	790316
1751	NAM..	46516	46612	92067-16125	REV.1903	740801
1752	P.PAS	46613	46641	92067-16125	REV.1903	740801
1753	RWSUB	46642	47207	92067-16125	REV.1903	781003
1754	CNT.	47210	47447	92067-16125	REV.1940	790802
1755	FCONT	47450	47542	92067-16125	REV.1903	780413
1756	BUMP.	47543	47601	92067-16125	REV.1903	741025
1757	SET.T	47602	47630	92067-16125	REV.1903	740801
1758	TL.	47631	47664	92067-16125	REV.1903	760322
1759	ST.TM	47665	47721	92067-16125	REV.1903	741223
1760	IFMTM	47722	47777	92067-16125	REV.1903	780403
1761	MESSS	50000	50333	92067-16261	REV.1903	790420
1762	CAPCK	50334	50660	92067-16268	REV.1940	790801
1763	SESTB	50661	50675	92067-16268	REV.1903	790202
1764	VSCBA	50676	50743	92067-16261	REV.1903	790202
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1766	FMGR6(0099)	37772	40003	92067-16185	REV.1903	790201
1767	CN..	40004	40044	92067-16185	REV.1903	741118
1768	JO..	40045	41144	92067-16185	REV.1903	790514
1769	RNRQ	41145	41406	92067-16268	REV.1903	780222
1770	KCVT	41407	41422	92067-16268	REV.1903	770621
1771	SCVT3	41423	41510	92067-16268	REV.1903	770621
1772	LOGLU	41511	41566	92067-16268	REV.1903	790228
1773	EO..	41567	42637	92067-16185	REV.1903	790514
1774	DTACH	42726	43006	92067-16268	REV.1903	781202
1775	LUSES	43007	43040	92067-16268	REV.1903	790122
1776	OF..	43041	43172	92067-16185	REV.1903	790209
1777	LG..	43173	43251	92067-16185	REV.1903	780929
1778	LII..	43254	45114	92067-16185	REV.1903	790514
1779	CAPCK	45250	45574	92067-16268	REV.1940	790801
1780	IDGET	45575	45657	92067-16268	REV.1903	790314
1781	SESTB	45660	45674	92067-16268	REV.1903	790202
1782	NAMF	45705	46214	92067-16125	REV.2001	790924
1783	READF	46226	47216	92067-16125	REV.2001	791015
1784	REIO	47217	47343	92067-16268	REV.1903	790316
1785	POST	47344	47372	92067-16125	REV.1903	740801
1786	NAM..	47373	47467	92067-16125	REV.1903	740801
1787	P.PAS	47470	47516	92067-16125	RFV.1903	740801
1788	RWSUB	47522	50067	92067-16125	REV.1903	781003
1789	SPOPN	50102	50165	92067-16125	REV.1940	790802
1790	SET.T	50166	50214	92067-16125	REV.1903	740801
1791	ST.TM	50215	50251	92067-16125	REV.1903	741223
1792	B.FLG	50252	50320	92067-16125	REV.1903	741118
1793	LULU.	50321	50414	92067-16125	REV.1903	780915
1794	RANGE	50415	50440	92067-16125	REV.1903	740801
1795	ONOFF	50441	51004	92067-16125	REV.1903	750128
1796	EX.TM	51005	51222	92067-16125	REV.1903	771115
1797	INPUT	51223	51243	92067-16125	REV.1903	740801
1798	LU.CL	51244	51315	92067-16125	REV.1903	780915

1799	AVAIL	51316	51410	92067-16125	REV.1903	741231
1800	FG.LU	51411	51576	92067-16125	REV.1903	780926
1801	SELUR	51602	52022	92067-16125	REV.1903	790322
1802	MESSS	52023	52356	92067-16261	REV.1903	790420
1803	VSCBA	52357	52424	92067-16261	REV.1903	790202
1804						
1805	FMGR7(0099)	37772	40000	92067-16185	REV.1903	760702
1806	??..	40001	43676	92067-16185	REV.2001	791015
1807	SY..	43700	44010	92067-16185	REV.1903	780929
1808	NX.JB	44012	45145	92067-16185	REV.1903	790301
1809	RNRQ	45146	45407	92067-16268	REV.1903	780222
1810	DTACH	45410	45470	92067-16268	REV.1903	781202
1811	LUSES	45471	45522	92067-16268	REV.1903	790122
1812	READF	45543	46533	92067-16125	REV.2001	791015
1813	REIO	46560	46704	92067-16268	REV.1903	790316
1814	POST	46705	46733	92067-16125	REV.1903	740801
1815	P.PAS	46734	46762	92067-16125	REV.1903	740801
1816	RWSUB	46763	47330	92067-16125	REV.1903	781003
1817	SPOPN	47331	47414	92067-16125	REV.1940	790802
1818	B.FLG	47415	47463	92067-16125	REV.1903	741118
1819	LULU.	47464	47557	92067-16125	REV.1903	780915
1820	LU.CL	47560	47631	92067-16125	REV.1903	780915
1821	FG.LU	47635	50022	92067-16125	REV.1903	780926
1822	ICAPS	50024	50050	92067-16125	REV.1903	781213
1823	.LGON	50051	50210	92067-16125	REV.2001	791028
1824	.CLGN	50211	50311	92067-16125	REV.1903	780928
1825	MESSS	50312	50645	92067-16261	REV.1903	790420
1826	IDGET	50646	50730	92067-16268	REV.1903	790314
1827	CAPCK	50731	51255	92067-16268	REV.1940	790801
1828	\$ESTB	51256	51272	92067-16268	REV.1903	790202
1829	VSCBA	51273	51340	92067-16261	REV.1903	790202
1830						
1831	FMGR8(0099)	37772	40000	92067-16185	REV.1903	790207
1832	CR..	40001	42574	92067-16185	REV.1903	790510
1833	SA..	40575	41720	92067-16185	REV.1903	781101
1834	SP..	41721	43052	92067-16185	REV.2001	791016
1835	IDGET	43150	43232	92067-16268	REV.1903	790314
1836	CREAT	43233	43577	92067-16125	REV.1903	790224
1837	READF	43617	44607	92067-16125	REV.2001	791015
1838	REIO	44641	44765	92067-16268	REV.1903	790316
1839	RWNDF	44766	45052	92067-16125	REV.1903	780724
1840	LOCF	45053	45353	92067-16125	REV.1903	781110
1841	NAM..	45354	45450	92067-16125	REV.1903	740801
1842	P.PAS	45451	45477	92067-16125	REV.1903	740801
1843	RWSUB	45504	46051	92067-16125	REV.1903	781003
1844	FM.UT	46054	47675	92067-16125	REV.1903	790515
1845	CREA.	47676	50016	92067-16125	REV.1903	781102
1846	CK.SM	50022	50145	92067-16125	REV.1903	771205
1847	READ.	50146	50172	92067-16125	REV.1903	740801
1848	SREAD	50173	50635	771116	24998-16001	
1849						
1850	FMGR9(0099)	37772	37777	92067-16185	REV.1903	790201
1851	LI..	40002	42036	92067-16185	REV.2001	791023
1852	CL..	42053	43030	92067-16185	REV.1940	790725
1853	READF	43035	44025	92067-16125	REV.2001	791015
1854	REIO	44026	44152	92067-16268	REV.1903	790316
1855	FSTAT	44153	44533	92067-16125	REV.1903	790118
1856	LOCF	44534	45034	92067-16125	REV.1903	781110
1857	NAM..	45035	45131	92067-16125	REV.1903	740801
1858	P.PAS	45132	45160	92067-16125	REV.1903	740801

1859	RWSUB	45161	45526	92067-16125	REV.1903	781003
1860	SM.BF	45527	45752	92067-16125	REV.1903	781229
1861	CL.BF	45753	46352	92067-16125	REV.1903	780714
1862	UT.BF	46353	46752	92067-16125	REV.1903	780714
1863	PGS.	46753	47061	92067-16125	REV.1903	781002
1864	ACNAM	47062	47653	92067-16125	REV.1903	790102
1865	POSNT	47660	50220	92067-16125	REV.1903	790316
1866	GTSCB	50242	50377	92067-16125	REV.1903	790709
1867						
1868	FMGRA(00999)	37772	37777	92067-16185	REV.1903	790201
1869	SM..	40000	40136	92067-16185	REV.1903	790102
1870	NAMR	40137	40433	750701	24998-16001	
1871	ME..	40434	40454	92067-16185	REV.1903	790109
1872	SM.SB	40524	42636	92067-16125	REV.1903	790510
1873	RNRQ	42637	43100	92067-16268	REV.1903	780222
1874	FTIME	43101	43372	92067-16268	REV.1903	780731
1875	CREAT	43373	43737	92067-16125	REV.1903	790224
1876	PURGE	43743	44233	92067-16125	REV.2001	790924
1877	READF	44243	45233	92067-16125	REV.2001	791015
1878	REIO	45234	45360	92067-16268	REV.1903	790316
1879	POSNT	45361	45721	92067-16125	REV.1903	790316
1880	APOSN	45725	46157	92067-16125	REV.1903	790503
1881	LOCF	46167	46467	92067-16125	REV.1903	781110
1882	NAM..	46470	46564	92067-16125	REV.1903	740801
1883	P.PAS	46565	46613	92067-16125	REV.1903	740801
1884	RWSUB	46614	47151	92067-16125	REV.1903	781003
1885	PARSN	47152	47571	92067-16125	REV.1940	790801
1886	IPRSN	47572	47660	92067-16125	REV.1903	790103
1887	KHAR	47661	50027	92067-16268	REV.1903	770525
1888	ME.SB	50036	51550	92067-16125	REV.1903	790510
1889	OPENF	51573	52131	92067-16125	REV.1940	790724
1890						
1891	LOGON(0050)	32042	40417	92067-16260	REV.1940	790801
1892	ABREG	40420	40441	750701	24998-16001	
1893	MOO	40442	40471	751101	24998-16001	
1894	RNRQ	40472	40733	92067-16268	REV.1903	780222
1895	SALRN	40734	41051	92067-16268	REV.1903	770715
1896	KCVT	41052	41065	92067-16268	REV.1903	770621
1897	CNUMD	41066	41105	92067-16268	REV.1903	770621
1898	SCVT3	41106	41173	92067-16268	REV.1903	770621
1899	IFTTY	41174	41261	92067-16268	REV.1903	790118
1900	IDGET	41262	41344	92067-16268	REV.1903	790314
1901	IXGET	41345	41354	92067-16268	REV.1903	780731
1902	IXPUT	41355	41373	92067-16268	REV.1903	780731
1903	FTIME	41374	41665	92067-16268	REV.1903	780731
1904	DTACH	41566	41746	92067-16268	REV.1903	781202
1905	CAPCK	41751	42275	92067-16268	REV.1940	790801
1906	SSMVE	42303	42371	92067-16268	REV.1903	790202
1907	SESTB	42372	42406	92067-16268	REV.1903	790202
1908	IDDUP	42407	43134	92067-16185	REV.1903	790122
1909	.OWNR	43135	43202	92067-16268	REV.1903	780919
1910	IDRPD	43203	43552	92067-16185	REV.1903	781002
1911	OPEN	43571	44133	92067-16125	REV.2001	791018
1912	RMPAR	44146	44210	781106	24998-16001	
1913	LURQ	44211	44623	92067-16268	REV.2001	791024
1914	LUTRU	44624	44732	92067-16268	REV.1903	790223
1915	READF	44733	45723	92067-16125	REV.2001	791015
1916	REIO	45731	46055	92067-16268	REV.1903	790316
1917	CLOSE	46057	46272	92067-16125	REV.2001	791019
1918	NAM..	46273	46367	92067-16125	REV.1903	740801

1919	SOPEN	46370	46544	92067-16125	REV.1903	790103
1920	P,PAS	46545	46573	92067-16125	REV.1903	740801
1921	RWSUB	46574	47141	92067-16125	REV.1903	781003
1922	RWNDS	47142	47264	92067-16125	REV.1903	780801
1923	R/WB	47265	47423	92067-16125	REV.1903	781214
1924	DCMC	47434	51650	92067-16125	REV.2001	791016
1925	FD,CK	52000	52157	92067-16125	REV.1940	790802
1926	OVRD.	52160	52160	92067-16125	REV.1903	780526
1927	SM,BF	52161	52404	92067-16125	REV.1903	781229
1928	CL,BF	52405	53004	92067-16125	REV.1903	780714
1929	SESSN	53005	53022	92067-16125	REV.1903	780413
1930	GTSCB	53023	53160	92067-16125	REV.1903	790709
1931	LSUBC	53161	53655	92067-16260	REV.1903	781114
1932	.SETB	53656	53732	92067-16268	REV.1903	780921
1933	LSUB1	53735	54344	92067-16260	REV.1903	790206
1934	MESSS	54355	54710	92067-16261	REV.1903	790420
1935	MKSCH	54711	55061	92067-16261	REV.1903	780518
1936	RLSCB	55062	55177	92067-16261	REV.1903	780518
1937	VSCBA	55200	55245	92067-16261	REV.1903	790202
1938						
1939	LGOFF(0090)	32042	36057	92067-16260	REV.1940	790726
1940	IGET	36060	36066	750701	24998-16001	
1941	MOD	36067	36116	751101	24998-16001	
1942	RNRQ	36117	36360	92067-16268	REV.1903	780222
1943	SALRN	36361	36476	92067-16268	REV.1903	770715
1944	KCVT	36477	36512	92067-16268	REV.1903	770621
1945	CNUMD	36513	36532	92067-16268	REV.1903	770621
1946	SCVT3	36533	36620	92067-16268	REV.1903	770621
1947	IFTTY	36621	36706	92067-16268	REV.1903	790118
1948	FTIME	36707	37200	92067-16268	REV.1903	780731
1949	DTACH	37201	37261	92067-16268	REV.1903	781202
1950	SSMVE	37262	37350	92067-16268	REV.1903	790202
1951	OPEN	37351	37713	92067-16125	REV.2001	791018
1952	RMPAR	37714	37756	781106	24998-16001	
1953	LURQ	37757	40371	92067-16268	REV.2001	791024
1954	LUTRU	40373	40501	92067-16268	REV.1903	790223
1955	READF	40502	41472	92067-16125	REV.2001	791015
1956	REIO	41473	41617	92067-16268	REV.1903	790316
1957	CLOSE	41627	42042	92067-16125	REV.2001	791019
1958	SOPEN	42051	42225	92067-16125	REV.1903	790103
1959	P,PAS	42226	42254	92067-16125	REV.1903	740801
1960	RWSUB	42255	42622	92067-16125	REV.1903	781003
1961	RWNDS	42623	42745	92067-16125	REV.1903	780801
1962	R/WB	42746	43104	92067-16125	REV.1903	781214
1963	DCMC	43133	45347	92067-16125	REV.2001	791016
1964	NAM..	45467	45563	92067-16125	REV.1903	740801
1965	FD,CK	45564	45743	92067-16125	REV.1940	790802
1966	OVRD.	45744	45744	92067-16125	REV.1903	780526
1967	SM,BF	45745	46170	92067-16125	REV.1903	781229
1968	CL,BF	46171	46570	92067-16125	REV.1903	780714
1969	SESSN	46571	46606	92067-16125	REV.1903	780413
1970	GTSCB	46607	46744	92067-16125	REV.1903	790709
1971	LSUBC	46745	47441	92067-16260	REV.1903	781114
1972	.SETB	47442	47516	92067-16268	REV.1903	780921
1973	LSUB2	47523	50264	92067-16260	REV.1903	790326
1974	IDRPO	50301	50650	92067-16185	REV.1903	781002
1975	IDGET	50651	50733	92067-16268	REV.1903	790314
1976	MESSS	50734	51267	92067-16261	REV.1903	790420
1977	CAPCK	51270	51614	92067-16268	REV.1940	790801
1978	SESTB	51615	51631	92067-16268	REV.1903	790202

1979	RLSCB	51632	51747	92067-16261	REV.1903	780518
1980	VSCBA	51753	52020	92067-16261	REV.1903	790202
1981						
1982	R\$PNS(0005)	32042	33171	92067-16260	REV.1940	790803
1983	\$PARS	33172	33412	92067-16268	REV.1903	780811
1984	SCVT3	33413	33500	92067-16268	REV.1903	770621
1985	IDGET	33501	33563	92067-16268	REV.1903	790314
1986	DTACH	33564	33644	92067-16268	REV.1903	781202
1987	LUTRU	33645	33753	92067-16268	REV.1903	790223
1988	FNDLU	33756	34117	92067-16268	REV.1903	780403
1989	CAPCK	34122	34446	92067-16268	REV.1940	790801
1990	SSMVE	34447	34535	92067-16268	REV.1903	790202
1991	.SETB	34536	34612	92067-16268	REV.1903	780921
1992	SESTB	34613	34627	92067-16268	REV.1903	790202
1993	IDDUP	34630	35355	92067-16185	REV.1903	790122
1994	.OWNR	35356	35423	92067-16268	REV.1903	780919
1995	NAM..	35424	35520	92067-16125	REV.1903	740801
1996	SELUR	35521	35741	92067-16125	REV.1903	790322
1997	PTERR	35742	35776	92067-16268	REV.1903	781013
1998	SESSN	35777	36014	92067-16125	REV.1903	780413
1999	MESSS	36015	36351	92067-16261	REV.1903	790420
2000	VSCBA	36352	36417	92067-16261	REV.1903	790202
2001						
2002	GASP (0080)	32042	34021	92067-16425	REV.1903	790628
2003	RMPAR	34022	34064	781106	24998-16001	
2004	RNRQ	34065	34326	92067-16268	REV.1903	780222
2005	SALRN	34327	34444	92067-16268	REV.1903	770715
2006	REIO	34445	34571	92067-16268	REV.1903	790316
2007	KCVT	34572	34605	92067-16268	REV.1903	770621
2008	PARSE	34606	34625	92067-16268	REV.1903	770714
2009	\$PARS	34626	35046	92067-16268	REV.1903	780811
2010	SCVT3	35047	35134	92067-16268	REV.1903	770621
2011	LOGLU	35135	35212	92067-16268	REV.1903	790228
2012	LUTRU	35213	35321	92067-16268	REV.1903	790223
2013	PTERR	35322	35356	92067-16268	REV.1903	781013
2014	SSMVE	35357	35445	92067-16268	REV.1903	790202
2015	OPEN	35450	36012	92067-16125	REV.2001	791018
2016	LURQ	36013	36425	92067-16268	REV.2001	791024
2017	IFTTY	36426	36513	92067-16268	REV.1903	790118
2018	READF	36514	37504	92067-16125	REV.2001	791015
2019	CLOSE	37505	37720	92067-16125	REV.2001	791019
2020	POST	37721	37747	92067-16125	REV.1903	740801
2021	SOPEN	37753	40127	92067-16125	REV.1903	790103
2022	P.PAS	40131	40157	92067-16125	REV.1903	740801
2023	RWSUB	40160	40525	92067-16125	REV.1903	781003
2024	RWND\$	40526	40650	92067-16125	REV.1903	780801
2025	R/W\$	40651	41007	92067-16125	REV.1903	781214
2026	OVRD.	41010	41010	92067-16125	REV.1903	780526
2027	ICAPS	41011	41035	92067-16125	REV.1903	781213
2028	SESSN	41036	41053	92067-16125	REV.1903	780413
2029	.CACT	41054	41103	92067-16125	REV.1903	780921
2030	G1CEX	41104	41255	92067-16425	REV.1903	790206
2031	PRTN	41256	41370	92067-16268	REV.1903	771005
2032	ST.LU	41371	41565	92067-16425	REV.1903	781010
2033	.DRCT	41566	41574	92067-16268	REV.1903	741120
2034	G1ROT	41575	41756	92067-16425	REV.1940	790802
2035	G00IP	41757	42256	92067-16425	REV.1903	781215
2036						
2037	GASP1(0099)	42257	42272	92067-16425	REV.1940	790802
2038	G1CDJ	42273	43064	92067-16425	REV.1903	780607

2039	G1CCJ	43067	44132	92067-16425	REV.1903	790621
2040	G1CKS	44152	45516	92067-16425	REV.1903	790625
2041	MFSSS	45531	46064	92067-16261	REV.1903	790420
2042	IDGET	46070	46152	92067-16268	REV.1903	790314
2043	CAPCK	46153	46477	92067-16268	REV.1940	790801
2044	SESTB	46500	46514	92067-16268	REV.1903	790202
2045	VSCBA	46515	46562	92067-16261	REV.1903	790202
2046	G1CDS	46625	50705	92067-16425	REV.1903	790703
2047	CNUMD	50715	50734	92067-16268	REV.1903	770621
2048	PARSN	50735	51344	92067-16125	REV.1940	790801
2049	IPRSN	51345	51433	92067-16125	REV.1903	790103
2050	KHAR	51434	51602	92067-16268	REV.1903	770525
2051	.UNAM	51603	51716	92067-16125	REV.1903	790129
2052	.CLGN	51723	52023	92067-16125	REV.1903	780928
2053	G1CUP	52025	52366	92067-16425	REV.1940	790531
2054	G1STM	52367	52631	92067-16425	REV.1903	790103
2055						
2056	GASP2(0099)	42257	42267	92067-16425	REV.1903	760615
2057	G1CSO	42270	42720	92067-16425	REV.1903	790625
2058	G1C??	42721	43675	92067-16425	REV.1903	790412
2059	G1CIN	43676	45431	92067-16425	REV.1940	790803
2060	CNUMD	45441	45460	92067-16268	REV.1903	770621
2061	CREAT	45466	46032	92067-16125	REV.1903	790224
2062	NAM..	46033	46127	92067-16125	REV.1903	740801
2063	G1CDA	46130	46716	92067-16425	REV.1903	790427
2064	PURGE	46717	47207	92067-16125	REV.2001	790924
2065						
2066	EDITR(0050)	32042	37146	92002-16010	REV.1926	790503
2067	NAMR	37147	37443	750701	24998-16001	
2068	LURQ	37457	40071	92067-16268	REV.2001	791024
2069	\$ALRN	40075	40212	92067-16268	REV.1903	770715
2070	PRTN	40213	40325	92067-16268	REV.1903	771005
2071	REIO	40326	40452	92067-16268	REV.1903	790316
2072	LUTRU	40453	40561	92067-16268	REV.1903	790223
2073	CREAT	40562	41126	92067-16125	REV.1903	790224
2074	RMPAR	41127	41171	781106	24998-16001	
2075	OPEN	41172	41534	92067-16125	REV.2001	791018
2076	IFTTY	41535	41622	92067-16268	REV.1903	790118
2077	\$\$MVE	41623	41711	92067-16268	REV.1903	790202
2078	READF	41714	42704	92067-16125	REV.2001	791015
2079	CLOSE	42720	43133	92067-16125	REV.2001	791019
2080	NAM..	43134	43230	92067-16125	REV.1903	740801
2081	\$OPEN	43231	43405	92067-16125	REV.1903	790103
2082	P..PAS	43406	43434	92067-16125	REV.1903	740801
2083	RWSUB	43435	44002	92067-16125	REV.1903	781003
2084	RWNDS	44003	44125	92067-16125	REV.1903	780801
2085	R/WS	44126	44264	92067-16125	REV.1903	781214
2086	DVRD.	44265	44265	92067-16125	REV.1903	780526
2087	SESSN	44266	44303	92067-16125	REV.1903	780413
2088						
2089	LGTAT(0099)	32042	34115	92067-16008	REV.1926	790504
2090	IFBRK	34116	34151	92067-16268	REV.1913	790124
2091	SCVT3	34152	34237	92067-16268	REV.1903	770621
2092						
2093	LCOPY(0010)	32042	53066	92067-16347	REV.2001	790830
2094	PAUSE	53067	53167	771122	24998-16001	
2095	RMPAR	53170	53232	781106	24998-16001	
2096	PAU.E	53233	53233	750701	24998-16001	
2097	PNAME	53234	53301	771121	24998-16001	
2098	PRTN	53302	53414	92067-16268	REV.1903	771005

2099	REIO	53415	53541	92067-16268	REV.1903	790316
2100	CNUMD	53542	53561	92067-16268	REV.1903	770621
2101	SCVT3	53562	53647	92067-16268	REV.1903	770621
2102	LOGLU	53650	53725	92067-16268	REV.1903	790228
2103	RDAWK	53726	55010	92067-16349	REV.2001	790712
2104	ABREG	55011	55032	750701	24998-16001	
2105	EQTRQ	55033	55553	92067-16268	REV.2001	791012
2106	SALRN	55554	55671	92067-16268	REV.1903	770715
2107	LUTRU	55672	56000	92067-16268	REV.1903	790223
2108	XSTAT	56001	56301	92022-16332	REV.2001	790710
2109	XSEEK	56302	56633	92067-16332	REV.2001	790424
2110	XDRED	56634	57150	92067-16332	REV.2001	790424
2111	XFMISK	57151	57347	92067-16332	REV.2001	790424
2112	XEND	57350	57536	92067-16332	REV.2001	790515
2113	XDSJ	57537	57644	92067-16348	REV.2001	790529
2114	XPRTY	57645	57672	92067-16332	REV.2001	790320
2115	IFDVR	57673	57735	92067-16332	REV.2001	790424
2116	WRTRK	57736	61164	92067-16349	REV.2001	790715
2117	XDWRRT	61165	61501	92067-16332	REV.2001	790424
2118	XDCAS	61502	61607	92067-16349	REV.2001	700526
2119	MXGTA	61610	61751	92067-16349	REV.1940	790526
2120	MOD	61752	62001	751101	24998-16001	
2121	ISHL	62003	62024	92067-16332	REV.2001	790524
2122	DATCO	62025	62033	92067-16349	REV.2001	790828
2123	MESSS	62034	62367	92067-16261	REV.1903	790420
2124	IDGET	62370	62452	92067-16268	REV.1903	790314
2125	CAPCK	62453	62777	92067-16268	REV.1940	790801
2126	SSMVE	63000	63066	92067-16268	REV.1903	790202
2127	SESTB	63067	63103	92067-16268	REV.1903	790202
2128	VSCBA	63104	63151	92067-16261	REV.1903	790202
2129						
2130	COMPL (0090)	32042	36533	92067-16359	REV.1903	790503
2131	MOD	36534	36563	751101	24998-16001	
2132	NAMR	36564	37060	750701	24998-16001	
2133	IABS	37061	37073	750701	24998-16001	
2134	PRTN	37074	37206	92067-16268	REV.1903	771005
2135	REIO	37207	37333	92067-16268	REV.1903	790316
2136	IFTTY	37334	37421	92067-16268	REV.1903	790118
2137	LOGLU	37422	37477	92067-16268	REV.1903	790228
2138	LUTRU	37500	37606	92067-16268	REV.1903	790223
2139	KHAR	37607	37755	92067-16268	REV.1903	770525
2140	INAMR	37757	40241	92067-16268	REV.1903	761013
2141	GETSP	40250	40260	92067-16104	REV.1903	790503
2142	CLERR	40261	40407	92067-16104	REV.1903	790203
2143	PTERR	40410	40444	92067-16268	REV.1903	781013
2144	SSMVE	40445	40533	92067-16268	REV.1903	790202
2145	CREAT	40534	41100	92067-16125	REV.1903	790224
2146	RMPAR	41101	41143	781106	24998-16001	
2147	OPEN	41144	41506	92067-16125	REV.2001	791018
2148	LURO	41527	42141	92067-16268	REV.2001	791024
2149	SALRN	42146	42263	92067-16268	REV.1903	770715
2150	PURGE	42264	42554	92067-16125	REV.2001	790924
2151	READF	42555	43545	92067-16125	REV.2001	791015
2152	FSTAT	43571	44151	92067-16125	REV.1903	790118
2153	CLOSE	44161	44374	92067-16125	REV.2001	791019
2154	NAM..	44375	44471	92067-16125	REV.1903	740801
2155	SOPEN	44472	44646	92067-16125	REV.1903	790103
2156	P.PAS	44647	44675	92067-16125	REV.1903	740801
2157	RWSUB	44676	45243	92067-16125	REV.1903	781003
2158	RWINDS	45244	45366	92067-16125	REV.1903	780801

2159	R/W\$	45367	45525	92067-16125	REV.1903	781214
2160	SPOPN	45526	45611	92067-16125	REV.1940	790802
2161	OVRD.	45612	45612	92067-16125	REV.1903	780526
2162	SM.BF	45613	46036	92067-16125	REV.1903	781229
2163	UT.BF	46037	46436	92067-16125	REV.1903	780714
2164	SESSN	46437	46454	92067-16125	REV.1903	780413
2165	XOPRG	46455	47172	92067-16125	REV.1903	781025
2166	ABREG	47173	47214	750701	24998-16001	
2167	IDRPD	47215	47564	92067-16185	REV.1903	781002
2168	IDGET	47565	47647	92067-16268	REV.1903	790314
2169	CLUNE	47657	50155	92067-16125	REV.1903	790420
2170	IXGET	50162	50171	92067-16268	REV.1903	780731
2171	IDDUP	50172	50717	92067-16185	REV.1903	790122
2172	.OWNR	50720	50765	92067-16268	REV.1903	780919
2173	IDRPL	50766	51743	92067-16185	REV.2001	791016
2174	GTSCB	51746	52103	92067-16125	REV.1903	790709
2175	MESSS	52110	52443	92067-16261	REV.1903	790420
2176	CAPCK	52444	52770	92067-16268	REV.1940	790801
2177	SESTB	52771	53005	92067-16268	REV.1903	790202
2178	VSCRA	53006	53053	92067-16261	REV.1903	790202
2179						
2180	CLOAD(0090)	32042	37356	92067-16358	REV.1903	790503
2181	MOD	37357	37406	751101	24998-16001	
2182	NAMR	37407	37703	750701	24998-16001	
2183	IABS	37704	37716	750701	24998-16001	
2184	PRTN	37724	40036	92067-16268	REV.1903	771005
2185	REIO	40044	40170	92067-16268	REV.1903	790316
2186	IFTTY	40171	40256	92067-16268	REV.1903	790118
2187	LOGLU	40257	40334	92067-16268	REV.1903	790228
2188	LUTRU	40335	40443	92067-16268	REV.1903	790223
2189	KHAR	40444	40612	92067-16268	REV.1903	770525
2190	INAMR	40613	41075	92067-16268	REV.1903	761013
2191	GETSP	41076	41106	92067-16104	REV.1903	790503
2192	CLERR	41107	41235	92067-16104	REV.1903	790203
2193	PTERR	41236	41272	92067-16268	REV.1903	781013
2194	SSMVE	41273	41361	92067-16268	REV.1903	790202
2195	CREAT	41362	41726	92067-16125	REV.1903	790224
2196	RMPAR	41727	41771	781106	24998-16001	
2197	OPEN	41772	42334	92067-16125	REV.2001	791018
2198	LURQ	42346	42760	92067-16268	REV.2001	791024
2199	SALRN	42761	43076	92067-16268	REV.1903	770715
2200	PURGE	43077	43367	92067-16125	REV.2001	790924
2201	READF	43413	44403	92067-16125	REV.2001	791015
2202	FSTAT	44420	45000	92067-16125	REV.1903	790118
2203	CLOSE	45001	45214	92067-16125	REV.2001	791019
2204	NAM..	45215	45311	92067-16125	REV.1903	740801
2205	SOPEN	45312	45466	92067-16125	REV.1903	790103
2206	P.PAS	45467	45515	92067-16125	REV.1903	740801
2207	RW\$SUB	45521	46066	92067-16125	REV.1903	781003
2208	RWNDS	46101	46223	92067-16125	REV.1903	780801
2209	R/W\$	46224	46362	92067-16125	REV.1903	781214
2210	SPOPN	46363	46446	92067-16125	REV.1940	790802
2211	OVRD.	46447	46447	92067-16125	REV.1903	780526
2212	SM.BF	46450	46673	92067-16125	REV.1903	781229
2213	UT.BF	46674	47273	92067-16125	REV.1903	780714
2214	SESSN	47274	47311	92067-16125	REV.1903	780413
2215	XOPRG	47320	50035	92067-16125	REV.1903	781025
2216	ABREG	50036	50057	750701	24998-16001	
2217	IDRPD	50060	50427	92067-16185	REV.1903	781002
2218	IDGET	50430	50512	92067-16268	REV.1903	790314

2219	CLONE	50513	51011	92067-16125	REV.1903	790420
2220	IXGET	51012	51021	92067-16268	REV.1903	780731
2221	IDDUP	51022	51547	92067-16185	REV.1903	790122
2222	.DWNR	51550	51615	92067-16268	REV.1903	780919
2223	IDRPL	51634	52611	92067-16185	REV.2001	791016
2224	GTSCB	52621	52756	92067-16125	REV.1903	790709
2225	MESSS	52757	53312	92067-16261	REV.1903	790420
2226	CAPCK	53313	53637	92067-16268	REV.1940	790801
2227	SESTB	53640	53654	92067-16268	REV.1903	790202
2228	VSCBA	53655	53722	92067-16261	REV.1903	790202
2229						
2230	READT(0090)	32042	60377	92067-16332	REV.1913	790628
2231	.TAPE	60400	60412	750701	24998-16001	
2232	ABREG	60413	60434	750701	24998-16001	
2233	NAMR	60435	60731	750701	24998-16001	
2234	RMPAR	60732	60774	781106	24998-16001	
2235	IABS	60775	61007	750701	24998-16001	
2236	LURQ	61010	61422	92067-16268	REV.2001	791024
2237	SALRN	61423	61540	92067-16268	REV.1903	770715
2238	REIO	61541	61665	92067-16268	REV.1903	790316
2239	KCVT	61666	61701	92067-16268	REV.1903	770621
2240	CNUMD	61702	61721	92067-16268	REV.1903	770621
2241	SCVT3	61724	62011	92067-16268	REV.1903	770621
2242	LOGLU	62013	62070	92067-16268	REV.1903	790228
2243	IXGET	62071	62100	92067-16268	REV.1903	780731
2244	LUTRU	62101	62207	92067-16268	REV.1903	790223
2245	SSMVE	62210	62276	92067-16268	REV.1903	790202
2246	PTERR	62277	62333	92067-16268	REV.1903	781013
2247	MT10K	62334	62422	92067-16104	REV.1903	790203
2248	FESSN	62423	62453	92067-16104	REV.1903	780413
2249	NMCHK	62454	62550	92067-16104	REV.1903	790203
2250	FSTAT	62551	63131	92067-16125	REV.1903	790118
2251	DCMC	63161	65375	92067-16125	REV.2001	791016
2252	NAM..	65516	65612	92067-16125	REV.1903	740801
2253	FD.CK	65613	65772	92067-16125	REV.1940	790802
2254	OVRD.	65773	65773	92067-16125	REV.1903	780526
2255	SM.BF	65774	66217	92067-16125	REV.1903	781229
2256	CL.BF	66220	66617	92067-16125	REV.1903	780714
2257	UT.BF	66620	67217	92067-16125	REV.1903	780714
2258	SESSN	67220	67235	92067-16125	REV.1903	780413
2259	GTSCB	67236	67373	92067-16125	REV.1903	790709
2260						
2261	WRITT(0090)	32042	56224	92067-16333	REV.1913	790628
2262	.TAPE	56225	56237	750701	24998-16001	
2263	ABREG	56240	56261	750701	24998-16001	
2264	NAMR	56262	56556	750701	24998-16001	
2265	RMPAR	56557	56621	781106	24998-16001	
2266	IABS	56622	56634	750701	24998-16001	
2267	LURQ	56635	57247	92067-16268	REV.2001	791024
2268	SALRN	57250	57365	92067-16268	REV.1903	770715
2269	REIO	57366	57512	92067-16268	REV.1903	790316
2270	IFBRK	57513	57546	92067-16268	REV.1913	790124
2271	CNUMD	57547	57566	92067-16268	REV.1903	770621
2272	SCVT3	57567	57654	92067-16268	REV.1903	770621
2273	LOGLU	57655	57732	92067-16268	REV.1903	790228
2274	IXGET	57733	57742	92067-16268	REV.1903	780731
2275	FTIME	57744	60235	92067-16268	REV.1903	780731
2276	LUTRU	60252	60360	92067-16268	REV.1903	790223
2277	SSMVE	60361	60447	92067-16268	REV.1903	790202
2278	PTERR	60450	60504	92067-16268	REV.1903	781013

2279	MT1OK	60505	60573	92067-16104	REV.1903	790203
2280	FESSN	60574	60624	92067-16104	REV.1903	780413
2281	NMCHK	60625	60721	92067-16104	REV.1903	790203
2282	FSTAT	60722	61302	92067-16125	REV.1903	790118
2283	SM.BF	61303	61526	92067-16125	REV.1903	781229
2284	UT.BF	61527	62126	92067-16125	REV.1903	780714
2285	SESSN	62127	62144	92067-16125	REV.1903	780413
2286	GTSCB	62145	62302	92067-16125	REV.1903	790709
2287						
2288	HELP (0099)	32042	34073	92067-16121	REV.1903	790312
2289	LOGLU	34074	34151	92067-16268	REV.1903	790228
2290	GTERR	34152	34204	92067-16268	REV.1903	780930
2291	SSMVE	34205	34273	92067-16268	REV.1903	790202
2292	OPEN	34274	34636	92067-16125	REV.2001	791018
2293	RMPAR	34637	34701	781106	24998-16001	
2294	LURQ	34702	35314	92067-16268	REV.2001	791024
2295	SALRN	35315	35432	92067-16268	REV.1903	770715
2296	IFTTY	35433	35520	92067-16268	REV.1903	790118
2297	LUTRU	35521	35627	92067-16268	REV.1903	790223
2298	READF	35640	36630	92067-16125	REV.2001	791015
2299	REIO	36663	37007	92067-16268	REV.1903	790316
2300	CLOSE	37010	37223	92067-16125	REV.2001	791019
2301	SOPEN	37224	37400	92067-16125	REV.1903	790103
2302	P.PAS	37401	37427	92067-16125	REV.1903	740821
2303	RWSUB	37430	37775	92067-16125	REV.1903	781003
2304	RWND\$	37776	40120	92067-16125	REV.1903	780801
2305	R/W\$	40124	40262	92067-16125	REV.1903	781214
2306	DVRD.	40263	40263	92067-16125	REV.1903	780526
2307	SESSN	40264	40301	92067-16125	REV.1903	780413
2308						
2309						
2310	LOADR(0090)	12042	27002	92067-16471	REV.1940	790801
2311	NAMR	27003	27277	750701	24998-16001	
2312	LURQ	27300	27712	92067-16268	REV.2001	791024
2313	SALRN	27721	30036	92067-16268	REV.1903	770715
2314	PRTN	30037	30151	92067-16268	REV.1903	771005
2315	REIO	30152	30276	92067-16268	REV.1903	790316
2316	IFBRK	30277	30332	92067-16268	REV.1913	790124
2317	SCVT3	30333	30420	92067-16268	REV.1903	770621
2318	LOGLU	30421	30476	92067-16268	REV.1903	790228
2319	FTIME	30477	30770	92067-16268	REV.1903	780731
2320	LUTRU	30771	31077	92067-16268	REV.1903	790223
2321	.OWNR	31100	31145	92067-16268	REV.1903	780919
2322	SSMVE	31146	31234	92067-16268	REV.1903	790202
2323	PTERR	31235	31271	92067-16268	REV.1903	781013
2324	L.FLG	31272	31521	92067-16470	REV.1940	790515
2325	L.INT	31522	31612	92067-16470	REV.1940	790201
2326	L.ADD	31613	31644	92067-16470	REV.1940	790321
2327	L.LDF	31645	31713	92067-16470	REV.1940	790402
2328	L.LUN	31714	31761	92067-16470	REV.1940	790201
2329	L.SYE	31763	32052	92067-16470	REV.1940	790408
2330	L.IFX	32060	32106	92067-16470	REV.1940	790321
2331	L.SG0	32107	32124	92067-16470	REV.1940	790201
2332	L.SGN	32125	32141	92067-16470	REV.1940	790201
2333	L.MAT	32142	32203	92067-16470	REV.1940	790321
2334	L.CLS	32204	32270	92067-16470	REV.1940	790515
2335	L.REL	32332	35513	92067-16470	REV.2001	791016
2336	CREAT	35563	36127	92067-16125	REV.1903	790224
2337	RMPAR	36144	36206	781106	24998-16001	
2338	OPEN	36207	36551	92067-16125	REV.2001	791018

2339	IFTTY	36552	36637	92067-16268	REV.1903	790118
2340	READF	36640	37630	92067-16125	REV.2001	791015
2341	POSNT	37641	40201	92067-16125	REV.1903	790316
2342	APOSN	40222	40454	92067-16125	REV.1903	790503
2343	LOCF	40455	40755	92067-16125	REV.1903	781110
2344	CLOSE	40756	41171	92067-16125	REV.2001	791019
2345	POST	41172	41222	92067-16125	REV.1903	740801
2346	NAM..	41221	41315	92067-16125	REV.1903	740801
2347	\$OPEN	41316	41472	92067-16125	REV.1903	790103
2348	P.PAS	41473	41521	92067-16125	REV.1903	740801
2349	RWSUB	41525	42072	92067-16125	REV.1903	781003
2350	RWNDS	42104	42226	92067-16125	REV.1903	780801
2351	R/W\$	42227	42365	92067-16125	REV.1903	781214
2352	DVRD.	42366	42366	92067-16125	REV.1903	780526
2353	SESSN	42367	42404	92067-16125	REV.1903	780413
2354						
2355	LSAVE(0010)	12042	34641	92067-16344	REV.2001	790712
2356	.TAPE	34642	34654	750701	24998-16001	
2357	ARREG	34655	34676	750701	24998-16001	
2358	NAMR	34677	35173	750701	24998-16001	
2359	PAUSE	35174	35274	771122	24998-16001	
2360	PAU.E	35275	35275	750701	24998-16001	
2361	PNAME	35276	35343	771121	24998-16001	
2362	LURQ	35344	35756	92067-16268	REV.2001	791024
2363	SALRN	35761	36076	92067-16268	REV.1903	770715
2364	PRTN	36101	36213	92067-16268	REV.1903	771005
2365	REIO	36214	36340	92067-16268	REV.1903	790316
2366	CNUMD	36341	36360	92067-16268	REV.1903	770621
2367	SCVT3	36361	36446	92067-16268	REV.1903	770621
2368	LOGLU	36447	36524	92067-16268	REV.1903	790228
2369	FTIME	36525	37016	92067-16268	REV.1903	780731
2370	LUTRU	37017	37125	92067-16268	REV.1903	790223
2371	RDATK	37170	40252	92067-16349	REV.2001	790712
2372	EOTRQ	40255	40775	92067-16268	REV.2001	791012
2373	XSTAT	40776	41276	92020-16332	REV.2001	790710
2374	XSEEK	41277	41630	92067-16332	REV.2001	790424
2375	XDRED	41645	42161	92067-16332	REV.2001	790424
2376	XFMSK	42167	42365	92067-16332	REV.2001	790424
2377	XEND	42366	42554	92067-16332	REV.2001	790515
2378	XDSJ	42555	42662	92067-16348	REV.2001	790529
2379	XPRTY	42663	42710	92067-16332	REV.2001	790320
2380	IFDVR	42711	42753	92067-16332	REV.2001	790424
2381	XDCAS	42754	43061	92067-16349	REV.2001	790526
2382	COMPR	43062	43132	92067-16349	REV.2001	790526
2383	XGTPM	43210	45454	92067-16349	REV.2001	790828
2384	EOTAP	45512	46230	92067-16349	REV.2001	790626
2385	WREOT	46233	46543	92067-16349	REV.2001	790723
2386	MXGTA	46544	46705	92067-16349	REV.1940	790526
2387	MOD	46706	46735	751101	24998-16001	
2388	ISHL	46736	46757	92067-16332	REV.2001	790524
2389	DATCO	46760	46766	92067-16349	REV.2001	790828
2390	MESSS	46767	47322	92067-16261	REV.1903	790420
2391	IDGET	47323	47405	92067-16268	REV.1903	790314
2392	CAPCK	47406	47732	92067-16268	REV.1940	790801
2393	SSMVE	47734	50022	92067-16268	REV.1903	790202
2394	SESTB	50025	50041	92067-16268	REV.1903	790202
2395	VSCBA	50042	50107	92067-16261	REV.1903	790202
2396						
2397	USAVER(0010)	12042	35032	92067-16345	REV.2001	790715
2398	.TAPE	35033	35045	750701	24998-16001	

2399	ABREG	35046	35067	750701	24998-16001
2400	NAMR	35070	35364	750701	24998-16001
2401	PAUSE	35365	35465	771122	24998-16001
2402	PAU.E	35466	35466	750701	24998-16001
2403	PNAME	35467	35534	771121	24998-16001
2404	LURQ	35554	36186	92067-16268	REV.2001 791024
2405	SALRN	36171	36306	92067-16268	REV.1903 770715
2406	PRTN	36307	36421	92067-16268	REV.1903 771005
2407	REIO	36422	36546	92067-16268	REV.1903 790316
2408	CNUMD	36547	36566	92067-16268	REV.1903 770621
2409	SCVT3	36567	36654	92067-16268	REV.1903 770621
2410	LOGLU	36655	36732	92067-16268	REV.1903 790228
2411	FTIME	36733	37224	92067-16268	REV.1903 780731
2412	LUTRU	37225	37333	92067-16268	REV.1903 790223
2413	RDATK	37365	40447	92067-16349	REV.2001 790712
2414	EOTRQ	40455	41175	92067-16268	REV.2001 791012
2415	XSTAT	41176	41476	92020-16332	REV.2001 790710
2416	XSEEK	41505	42036	92067-16332	REV.2001 790424
2417	XDRED	42037	42353	92067-16332	REV.2001 790424
2418	XFM SK	42354	42552	92067-16332	REV.2001 790424
2419	XEND	42553	42741	92067-16332	REV.2001 790515
2420	XDSJ	42742	43047	92067-16348	REV.2001 790529
2421	XPR TY	43050	43075	92067-16332	REV.2001 790320
2422	IFDV R	43076	43140	92067-16332	REV.2001 790424
2423	XDCAS	43141	43246	92067-16349	REV. 2001 790526
2424	COMPR	43247	43317	92067-16349	REV.2001 790526
2425	XGTPM	43366	45632	92067-16349	REV.2001 790828
2426	EOTAP	45654	46372	92067-16349	REV.2001 790626
2427	WREOT	46376	46706	92067-16349	REV.2001 790723
2428	MXGTA	46707	47050	92067-16349	REV.1940 790526
2429	MOD	47051	47100	751101	24998-16001
2430	ISHL	47101	47122	92067-16332	REV.2001 790524
2431	DATCO	47123	47131	92067-16349	REV.2001 790828
2432	MESSS	47132	47465	92067-16261	REV.1903 790420
2433	IDGET	47466	47550	92067-16268	REV.1903 790314
2434	CAPCK	47570	50114	92067-16268	REV.1940 790801
2435	SSMVE	50121	50207	92067-16268	REV.1903 790202
2436	\$ESTB	50210	50224	92067-16268	REV.1903 790202
2437	VSCBA	50225	50272	92067-16261	REV.1903 790202
2438					
2439	RESTR(0010)	12042	34606	92067-16346,REV.2001	790716
2440	ABREG	34607	34630	750701	24998-16001
2441	PAUSE	34631	34731	771122	24998-16001
2442	PAU.E	34732	34732	750701	24998-16001
2443	PNAME	34733	35000	771121	24998-16001
2444	LURQ	35001	35413	92067-16268	REV.2001 791024
2445	SALRN	35414	35531	92067-16268	REV.1903 770715
2446	PRTN	35532	35644	92067-16268	REV.1903 771005
2447	REIO	35645	35771	92067-16268	REV.1903 790316
2448	LOGLU	35772	36047	92067-16268	REV.1903 790228
2449	LUTRU	36051	36157	92067-16268	REV.1903 790223
2450	WRTRK	36160	37406	92067-16349	REV.2001 790715
2451	EOTRQ	37427	40147	92067-16268	REV.2001 791012
2452	SCVT3	40153	40240	92067-16268	REV.1903 770621
2453	XSTAT	40241	40541	92020-16332	REV.2001 790710
2454	XSEEK	40542	41073	92067-16332	REV.2001 790424
2455	XDWRT	41074	41410	92067-16332	REV.2001 790424
2456	XFM SK	41411	41607	92067-16332	REV.2001 790424
2457	XEND	41610	41776	92067-16332	REV.2001 790515
2458	XDSJ	41777	42104	92067-16348	REV.2001 790529

2459	XPRTY	42105	42132	92067-16332	REV.2001	790320
2460	IFDVR	42133	42175	92067-16332	REV.2001	790424
2461	XDCAS	42176	42303	92067-16349	REV. 2001	790526
2462	COMPR	42304	42354	92067-16349	REV.2001	790526
2463	XGTPM	42444	44710	92067-16349	REV.2001	790828
2464	NAMR	44716	45212	750701	24998-16001	
2465	CNUMD	45213	45232	92067-16268	REV.1903	770621
2466	EOTAP	45233	45751	92067-16349	REV.2001	790626
2467	MXGTA	45754	46115	92067-16349	REV.1940	790526
2468	MOD	46126	46155	751101	24998-16001	
2469	ISHL	46156	46177	92067-16332	REV.2001	790524
2470	DATCO	46200	46206	92067-16349	REV.2001	790828
2471	MESSS	46207	46542	92067-16261	REV.1903	790420
2472	IDGET	46543	46625	92067-16268	REV.1903	790314
2473	CAPCK	46626	47152	92067-16268	REV.1940	790801
2474	SSMVE	47153	47241	92067-16268	REV.1903	790202
2475	\$ESTB	47242	47256	92067-16268	REV.1903	790202
2476	VSCRA	47257	47324	92067-16261	REV.1903	790202
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2478	ACCTS(0090)	12042	12535	92067-16361	REV.2001	791022
2479	ABREG	12536	12557	750701	24998-16001	
2480	NAMR	12550	13054	750701	24998-16001	
2481	RMPAR	13055	13117	781106	24998-16001	
2482	PNAME	13120	13165	771121	24998-16001	
2483	IFTTY	13166	13253	92067-16268	REV.1903	790116
2484	LOGLU	13254	13331	92067-16268	REV.1903	790228
2485	DTACH	13332	13412	92067-16268	REV.1903	781202
2486	LUTRU	13413	13521	92067-16268	REV.1903	790223
2487	ACOM2	13522	13543			
2488	ACOM3	13544	14437			
2489	ACOM4	14440	14514			
2490	ACOM5	14515	14517			
2491	ACOM6	14520	14531			
2492	ACOM7	14532	14560			
2493	ACOM9	14561	14770			
2494	ACOMB	14771	15123			
2495	ACOMC	15124	15144			
2496	ACOMD	15145	15155			
2497	ACMND	15230	16440	92067-16361	REV.1940	790801
2498	RNRQ	15447	16710	92067-16268	REV.1903	780222
2499	SALRN	16711	17026	92067-16268	REV.1903	770715
2500	ACOMA	17027	17033			
2501	ACPAS	17034	17325	92067-16362	REV.1940	790801
2502	READF	17355	20345	92067-16125	REV.2001	791015
2503	REIO	20365	20511	92067-16268	REV.1903	790316
2504	P.PAS	20512	20540	92067-16125	REV.1903	740801
2505	RWSIIB	20541	21106	92067-16125	REV.1903	781003
2506	RWNDS	21107	21231	92067-16125	REV.1903	780801
2507	R/WS	21232	21370	92067-16125	REV.1903	781214
2508	ACOM1	21371	23010			
2509	ACPSN	23011	23331	92067-16362	REV.1940	790801
2510	PARSN	23332	23741	92067-16125	REV.1940	790801
2511	ACLNK	23745	24020	92067-16363	REV.1940	790214
2512	SEGLD	24022	24121	92067-16268	REV.1913	790202
2513	ACOPL	24122	24673	92067-16363	REV.2001	791016
2514	IXOR	24674	24704	750701	24998-16001	
2515	IABS	24705	24717	750701	24998-16001	
2516	LURQ	24720	25332	92067-16268	REV.2001	791024
2517	ACOPN	25333	25437	92067-16362	REV.2001	791018
2518	SSMVE	25440	25526	92067-16268	REV.1903	790202

2519	OPEN	25545	26107	92067-16125	REV.2001	791018
2520	LOCF	26122	26422	92067-16125	REV.1903	781110
2521	CLOSE	26423	26636	92067-16125	REV.2001	791019
2522	SOPEN	26637	27013	92067-16125	REV.1903	790103
2523	OVRD.	27014	27014	92067-16125	REV.1903	780526
2524	SESSN	27015	27032	92067-16125	REV.1903	780413
2525	ACLOCK	27033	27206	92067-16363	REV.1940	790721
2526	IFBRK	27207	27242	92067-16268	REV.1913	790124
2527	ACROP	27243	27350	92067-16363	REV.1940	790721
2528	CREAT	27351	27715	92067-16125	REV.1903	790224
2529	POSNT	27721	30261	92067-16125	REV.1903	790316
2530	NAM..	30277	30373	92067-16125	REV.1903	740801
2531	ACTRM	30374	30564	92067-16363	REV.2001	791020
2532	ACCLS	30565	30647	92067-16363	REV.1940	790722
2533	ACPRM	30650	30742	92067-16363	REV.1940	790125
2534	ACOM8	30743	31013			
2535	ACREI	31014	31451	92067-16363	REV.1940	790309
2536	ACHLP	31463	32057	92067-16363	REV.1940	790722
2537	ACOLL	32060	32170	92067-16363	REV.1940	790721
2538	ACERR	32171	32240	92067-16363	REV.1940	790307
2539	PTERR	32241	32275	92067-16268	REV.1903	781013
2540	ACWRL	32276	32504	92067-16363	REV.1940	790606
2541	ACITA	32505	32600	92067-16361	REV.1940	780801
2542	IFBNR	32601	33033	92067-16363	REV.1940	790104
2543	MBYTE	33034	33051	92067-16363	REV.1940	780822
2544	ACXFR	33111	34266	92067-16363	REV.1940	790722
2545	APOSN	34272	34524	92067-16125	REV.1903	790503
2546	ACTIN	34525	34652	92067-16363	REV.1940	781024
2547	ACWRI	34653	35113	92067-16363	REV.1940	781024
2548						
2549	ACCT1(0099)	35114	42017	92067-16361	REV.2001	791020
2550	MOU	42020	42047	751101	24998-16001	
2551	NAMF	42050	42357	92067-16125	REV.2001	790924
2552	ACCRE	42360	42456	92067-16362	REV.1940	790801
2553	PURGE	42457	42747	92067-16125	REV.2001	790924
2554	ACINT	42750	42763	92067-16362	REV.1940	790515
2555	ACACP	43047	44561	92067-16363	REV.2001	791021
2556	MESSS	44565	45120	92067-16261	REV.1903	790420
2557	IDGET	45121	45203	92067-16268	REV.1903	790314
2558	CAPCK	45204	45530	92067-16268	REV.1940	790801
2559	SESTB	45531	45545	92067-16268	REV.1903	790202
2560	VSCBA	45546	45613	92067-16261	REV.1903	790202
2561	ACNVS	45614	45667	92067-16363	REV.1940	781024
2562	ACGSP	45701	46121	92067-16363	REV.1940	790124
2563	ACSID	46126	46426	92067-16363	REV.1940	790117
2564	ACSBT	46427	46452	92067-16363	REV.1940	781212
2565	IVBIJF	46453	46613	92067-16363	REV.1940	781010
2566	ACINM	46614	47235	92067-16363	REV.2001	791016
2567	SBALC	47236	47715	92067-16268	REV.2001	791016
2568	ACPGA	47716	47766	92067-16363	REV.1940	781011
2569	ACDIR	47770	50260	92067-16363	REV.1940	781024
2570	ACSES	50266	50516	92067-16363	REV.2001	791020
2571						
2572	ACCT2(0099)	35114	35245	92067-16361	REV.1940	790725
2573	ACLOA	35311	37565	92067-16362	REV.2001	791018
2574	PURGE	37605	40075	92067-16125	REV.2001	790924
2575	NAMF	40077	40406	92067-16125	REV.2001	790924
2576	ACCRE	40407	40505	92067-16362	REV.1940	790801
2577	ACNWG	40506	41642	92067-16362	REV.1940	790227
2578	ACNUW	41643	46221	92067-16362	REV.1940	790722

2579	ACNVS	46223	46276	92067-16363	REV.1940	781024
2580	ACFDF	46277	46473	92067-16363	REV.1940	781211
2581	MOD	46474	46523	751101	24998-16001	
2582	ACGTU	46524	46602	92067-16363	REV.1940	781024
2583	ACGID	46603	47150	92067-16363	REV.1940	781024
2584	ACGBT	47151	47227	92067-16363	REV.1940	780807
2585	ACMSN	47230	47257	92067-16363	REV.1940	781226
2586	ACPAG	47260	47330	92067-16363	REV.1940	781011
2587	ACDIR	47331	47621	92067-16363	REV.1940	781024
2588	ACFDA	47637	50461	92067-16363	REV.1940	781024
2589	ACREL	50474	50632	92067-16363	REV.1940	781212
2590	ACSES	50633	51063	92067-16363	REV.2001	791020
2591						
2592	ACCT3(0099)	35114	35162	92067-16361	REV.1940	790724
2593	ACALU	35222	42752	92067-16361	REV.1940	790726
2594	ACAPA	42756	43242	92067-16362	REV.1940	790801
2595	ACPUU	43255	45312	92067-16362	REV.1940	790725
2596	MOD	45315	45344	751101	24998-16001	
2597	KHAR	45345	45513	92067-16268	REV.1903	770525
2598	IPRSN	45514	45602	92067-16125	REV.1903	790103
2599	ACAST	45617	46074	92067-16363	REV.1940	781024
2600	ACNVS	46101	46154	92067-16363	REV.1940	781024
2601	ACFDF	46155	46351	92067-16363	REV.1940	781211
2602	ACGTU	46352	46430	92067-16363	REV.1940	781024
2603	ACSID	46431	46731	92067-16363	REV.1940	790117
2604	ACSBT	46732	46755	92067-16363	REV.1940	781212
2605	IVBUF	46756	47116	92067-16363	REV.1940	781010
2606	ACPAG	47117	47167	92067-16363	REV.1940	781011
2607	ACDIR	47170	47460	92067-16363	REV.1940	781024
2608	ACFDA	47505	50327	92067-16363	REV.1940	781024
2609						
2610	ACCT4(0099)	35114	35314	92067-16361	REV.1940	790725
2611	ACLIU	35363	37702	92067-16362	REV.1940	790724
2612	ACLIA	37705	43034	92067-16362	REV.2001	791020
2613	MOD	43040	43067	751101	24998-16001	
2614	ACPUA	43132	44664	92067-16362	REV.1940	790801
2615	ACSDN	44670	45055	92067-16362	REV.1940	790111
2616	LUSES	45056	45107	92067-16268	REV.1903	790122
2617	ACSTR	45110	45162	92067-16363	REV.1940	781024
2618	ACNVS	45163	45236	92067-16363	REV.1940	781024
2619	ACTIM	45237	45511	92067-16363	REV.1940	781024
2620	ACNFG	45512	45621	92067-16363	REV.1940	790309
2621	ACGSP	45632	46052	92067-16363	REV.1940	790124
2622	ACGTG	46056	46150	92067-16363	REV.1940	781024
2623	ACGTU	46151	46227	92067-16363	REV.1940	781024
2624	IVBUF	46230	46370	92067-16363	REV.1940	781010
2625	ACLTM	46371	46714	92067-16363	REV.1940	780823
2626	ACDDV	46715	46743	92067-16363	REV.1940	790306
2627	ACFDA	46744	47566	92067-16363	REV.1940	781024
2628	ACFMT	47610	50165	92067-16363	REV.1940	790725
2629	ACSES	50172	50422	92067-16363	REV.2001	791020
2630						
2631	ACCT5(0099)	35114	35155	92067-16361	REV.1940	781213
2632	ACALT	35215	41040	92067-16361	REV.1940	790424
2633	MOD	41044	41073	751101	24998-16001	
2634	ACWRH	41075	43407	92067-16362	REV.1940	790801
2635	ACTEL	43447	44401	92067-16363	REV.1940	790412
2636	RWNDF	44404	44470	92067-16125	REV.1903	780724
2637	ACCGT	44471	44566	92067-16363	REV.1940	790412
2638	ACUNL	44651	45406	92067-16363	REV.1940	790625

2639 ACNVS 46411 46464 92067-16363 REV.1940 781024
2640 ACASB 46465 46604 92067-16363 REV.1940 781111
2641 IVBUF 46605 46745 92067-16363 REV.1940 781010
2642 ACINM 46746 47367 92067-16363 REV.2001 791016
2643 \$BALC 47372 50051 92067-16268 REV.2001 791016
2644 ACMSN 50061 50110 92067-16363 REV.1940 781226
2645 ACNXA 50111 50365 92067-16363 REV.1940 781116
2646 ACFID 50366 50415 92067-16363 REV.1940 781116
2647 ACFDA 50416 51240 92067-16363 REV.1940 781024
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2807 -
2808 /E
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2812 ■ 04000 BLOCKS (128 WORDS/BLOCK)
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2815

ERROR SUMMARY

APPENDIX

G

Appendix G

Error Summary

ON-LINE GENERATOR ERROR CODES

The On-Line Generator issues two types of error codes:

1. An error resulting from a file reference causes an FMP error code to be issued in the form:

FMP ERR-nn filenm

where:

nn is a decimal number equivalent to the FMP error codes that are defined in the HP Batch-Spool Monitor Reference Manual.

filenm is the file name or LU on which the error occurred.

An FMP error may result from incorrect references to the list file, absolute output file, answer file, bootstrap file, scratch file, or a file specified in a RELOCATE command.

2. An error resulting from on-line generation processing causes a generator error to be issued in the form:

GEN ERR nn
(name)

where:

nn is a positive number representing the generator error codes defined below.

(name) specifies, in some error messages, the program or entry point name, further identifying the cause of the error.

GEN ERR CODES

If an error condition is encountered during execution of the On-Line Generator program, the appropriate error code is printed on the list device and user console.

-----+	
	GEN ERR 00
-----+	

Meaning: Irrecoverable error.

Action: If the error is accompanied by an FMP ERR, check the cause of the problem.

The problem may be hardware-oriented, symptomatic of disc transfer/DCPC problems, in which case the appropriate diagnostics should be run. Ensure that the memory configuration in which RT4GN is executing has the correct amount of physical memory.

If the error is not accompanied by an FMP ERR, an actual generator problem (relating to its internal table structures) may exist, so send your generation listing and answer file to your local HP Field Service Office for analysis.

-----+	
	GEN ERR 01
-----+	

Meaning: Invalid response to generator request.

This is a general error message for invalid responses such as: incorrect type, number out of bounds, negative numbers, etc.

Action: Request is redisplayed. Enter valid response.

	GEN ERR 02

Meaning: Insufficient amount of available memory for internal generator tables.

Action: Irrecoverable error. Rerun the On-Line Generator program and either increase the partition size requirements or increase the size of the background program in which the generator will run, as appropriate.

	GEN ERR 03

Meaning: Relocatable record out of sequence.

Action: Module is skipped; replace module. Message printed on list device only; control is not transferred to the user console.

	GEN ERR 04

Meaning: Illegal record type.

Action: Module is skipped. Message printed on list device only; control is not transferred to the user console.

	GEN ERR 05

Meaning: Duplicate entry point (the current entry point replaces the previous entry point).

Action: Revise program by relabeling the entry points. Message printed on list device only; control is not transferred to the user console.

GEN ERR 06

Meaning: Command error during Program Input Phase; often accompanied by an FMP error (see FMP error code definitions).

Action: Reenter valid command.

GEN ERR 07

Meaning: Generator symbol table overflow.

Action: Irrecoverable error. Rerun the On-Line Generator program and revise or delete programs. (Remember that programs may later be loaded on-line.)

GEN ERR 08

Meaning: Duplicate program name.

Action: The current program replaces the previous program. Message printed on list device only; control is not transferred to the user console.

GEN ERR 09

Meaning: Parameter name error. Program does not exist.

Action: Enter valid parameter statement.

```
+-----+  
|      GEN ERR 10 |  
+-----+
```

Meaning: Parameter type error, or EMA symbols (entry points) cannot be changed.

Action: Enter valid parameter statement.

```
+-----+  
|      GEN ERR 11 |  
+-----+
```

Meaning: Parameter priority error.

Action: Enter valid parameter statement.

```
+-----+  
|      GEN ERR 12 |  
+-----+
```

Meaning: Parameter execution interval error.

Action: Enter valid parameter statement.

```
+-----+  
|      GEN ERR 13 |  
+-----+
```

Meaning: Program segment precedes main disc resident program.

Action: Module is skipped. Either revise module or reorder RELOCATE command entries.

```
+-----+  
|      GEN ERR 14 |  
+-----+
```

Meaning: Checksum error on relocatable record.

Action: Module is skipped. Message printed on list device only; control is not transferred to the user console.

GEN ERR 15
name

Meaning: Illegal reference to a Type 7 module by a Type 6 or 14 module (name is the illegally referenced symbol).

Action: Revise the calling module. Message printed on list device only; control is not transferred to the user console.

GEN ERR 16

Meaning: Base page linkage overflow into driver link area. Link value is zero.

Action: Either revise programs and order of program loading or specify LINKS IN CURRENT to reduce linkage requirements. Message printed on list device only; control is not transferred to the user console.

GEN ERR 17

Meaning: 1. Following the OUTPUT FILE NAMR? query, the size parameter in the output file namr was not specified or was specified as less than the minimum size required (1000 blocks).

2. Type 1 output file overflow.

Action: For 1 above, reenter the response with the size parameter included. Estimate a large value if uncertain. For 2 above, it is an irrecoverable error. Rerun the On-Line Generator program increasing the size parameter in the output file namr.

```
+-----+  
| GEN ERR 18 |  
+-----+
```

Meaning: Memory overflow (absolute code exceeds Last Word Available memory).

Action: If the configuration module plus links exceeds location 77577B (7900 and MAC based system), or 77377B (ICD based system), and if the generation is in memory resident load phase, the generator is aborted. Rerun the On-Line Generator program and revise order of program loading. Otherwise (for user programs), the message is printed on the list device only; control is not transferred to the user console.

```
+-----+  
| GEN ERR 19 |  
+-----+
```

Meaning: Transfer (TR) request nesting level greater than ten; or empty stack.

Action: Revise and reenter response.

```
+-----+  
| GEN ERR 20 |  
+-----+
```

Meaning: Transfer (TR) request was to an illegal logical unit for command input.

Action: Revise and reenter response.

```
+-----+  
| GEN ERR 21 |  
+-----+
```

Meaning: System module containing entry point \$CIC not loaded.

Action: Irrecoverable error. Rerun the On-Line Generator program after ensuring that all of the necessary system modules have been specified in RELOCATE commands.

GEN ERR 22

Meaning: List file error. Usually an FMP ERR-6 occurring when a list file extent cannot be created due to lack of disc space on the same subchannel.

Action: Respond YES or NO to the query OK TO CONTINUE?

A YES response causes the listed output to be sent to the user console only. A TR does not need to be done if command input was being received from an answer file or LU. (Note that the list file will be truncated at this point.)

A NO response terminates the generation.

GEN ERR 23

Meaning: Invalid S or M operands (must conform to previous EQT definitions using same driver) or system disc driver (whose EQT select code matches CONTROLLER SELECT CODE? response) cannot specify SDA.

Action: Enter valid EQT statement.

GEN ERR 24

Meaning: Invalid select code number.

Action: Enter valid EQT statement.

GEN ERR 25

Meaning: EQT entry specified non-existent driver. Invalid driver name or no driver entry points.

Action: Enter valid EQT statement.

GEN	ERR 26

Meaning: Invalid or duplicate D, B, T, S, M, or X operands.

Action: Enter valid EQT statement.

GEN	ERR 27

Meaning: Invalid equipment table number.

Action: Enter valid DRT statement.

GEN	ERR 28

Meaning: Invalid select code number.

Action: Enter valid INT statement.

GEN	ERR 29

Meaning: Select code number decreasing.

Action: Enter valid INT statement (select codes must be entered in the Interrupt Table in ascending order).

GEN	ERR 30

Meaning: Invalid mnemonic (meaning EQT, PRG, etc.).

Action: Enter valid INT statement.

GEN ERR 31

Meaning: Invalid EQT number in an INT statement.

Action: Enter valid INT statement.

GEN ERR 32

Meaning: Invalid program name in an INT statement.

Action: Enter valid INT statement.

GEN ERR 33

Meaning: Invalid entry point in an INT statement. If the entry refers to a driver entry point, the driver to be entered cannot reside in a driver partition.

Action: Enter valid INT statement.

GEN ERR 34

Meaning: Invalid absolute value in an INT statement.

Action: Enter valid INT statement.

GEN ERR 35

Meaning: More than 63 EQT or 254 DRT entries defined. Message printed until a /E encountered.

Action: Revise answer file.

GEN ERR 36

Meaning: Invalid number of characters in final operand (destination parameter).

Action: Enter valid INT statement.

GEN ERR 37
name

Meaning: Invalid declaration of COMMON in system or library program (name is the program's name).

Action: Revise the program. Message printed on list device only; control is not transferred to the user console.

GEN ERR 38

Meaning: ID segment for the generator's largest segment cannot be found.

Action: Ensure that the generator and its program segments are properly loaded. (RT4GN and its segments must be loaded before you start your generation. The most common cause for this error is executing RT4GN when it and its segments are stored in Type 6 FMP files. In this case, make sure that RT4GN and its eight segments are restored with the RP command.)

GEN ERR 39

NOT USED

GEN ERR 40
name

Meaning: Invalid EMA program type--must be real-time or background disc resident (name is the program's name).

Action: Revise program type. Program will not be loaded into the system during this generation unless it has a valid type.

GEN ERR 41

Meaning: Multiple EMA declarations in one program.

Action: Module is skipped. Revise the program.

GEN ERR 42
name

Meaning: Either invalid reference to an EMA symbol (entry point) by a non-EMA program or to an EMA symbol belonging to another program (name is the EMA symbol).

Action: The referencing instruction is replaced with a NOP. Revise the program.

GEN ERR 43

Meaning: Invalid mapping segment (MSEG) size for an EMA program. Either the generation-determined default size results in a value ≤ 0 , or the specified size was too large to fit in the user logical address space.

Action: The program relocation is aborted and no ID segment is built for that program. Revise the program.

GEN ERR 44

Meaning: Invalid response to ENTER 1st PARTITION PAGE XXXXX (DEFAULT) to YYYYYY query.

Action: Reenter the response to define the System Available Memory extension within the range XXXXX to YYYYYY, or enter a 0.

GEN ERR 45

Meaning: Invalid partition size.

Action: Reenter partition description with valid decimal size, in the range of 1 through 1024 pages.

GEN ERR 46

Meaning: Invalid partition type.

Action: Reenter partition description with valid type -- BG, RT, or S.

GEN ERR 47

Meaning: Invalid reservation parameter.

Action: Reenter partition description. Third parameter must be an "R" to reserve a partition.

GEN ERR 48

Meaning: Invalid or unknown program name.

Action: Either reenter response with corrected name or enter a /E to end this sequence.

GEN ERR 49

Meaning: Invalid partition number.

Action: Either reenter program partition assignment response with corrected number or, if defining partitions, enter a /E to end this sequence because the maximum number of partitions has been exceeded.

GEN ERR 50

Meaning: Program specified is too large for partition assigned.

Action: Either assign program to a larger partition or continue without assigning this program.

GEN ERR 51

Meaning: Invalid page size; either smaller than the program size, or larger than the maximum program size.

Action: Either reenter response with valid size or continue without overriding this program's page requirements.

```
+-----+  
| GEN ERR 52 |  
| name       |  
+-----+
```

Meaning: Module being relocated references an SSGA entry point but does not have the proper program type to allow SSGA access (name is the SSGA entry point).

Action: Revise the calling module or, during Parameter Input Phase, change the main program involved to a type that allows SSGA access or to a Type 8 to delete it from the generation. Message printed on list device only; control is not transferred to the user console.

```
+-----+  
| GEN ERR 53 |  
+-----+
```

Meaning: Upon receiving a /E, the sum of all partition sizes does not equal the number of pages remaining after System Available Memory.

Action: Redefine all partitions, until 0 pages remain.

```
+-----+  
| GEN ERR 54 |  
+-----+
```

Meaning: A subroutine or segment has declared more COMMON than the associated main program.

Action: Recompile the main program, declaring the maximum COMMON needed by any segment or subroutine to be used. Message printed on list device only; control is not transferred to the user console.

```
+-----+  
| GEN ERR 55 |  
+-----+
```

Meaning: The page requirements of an EMA program cannot be overridden.

Action: Entry is skipped. Message printed on list device only; control is not transferred to the user console.

GEN ERR 56

Meaning: Subpartition size is greater than the number of pages left in mother partition.

Action: Either revise and reenter response for last subpartition defined or return to RT/BG partition definition.

GEN ERR 57
name

Meaning: A system module or entry point is missing (name is the entry point name).

Action: Irrecoverable error. Rerun the On-Line Generator program after ensuring that all necessary system modules have been specified in RELOCATE commands.

GEN ERR 58
name

Meaning: Illegal reference to a system (Type 0) module by a non-HP subsystem module (name is the entry point name).

Action: Revise the calling module. Message printed on list device only; control is not transferred to the user console.

GEN ERR 59

Meaning: Driver partition overflow.

Action: Irrecoverable error. Rerun the On-Line Generator program and increase the driver partition size to accomodate larger driver, or force driver into SDA (via its EQT definition).

GEN ERR 60

Meaning: Long ID Segment limit of 254 exceeded. If more than 254 ID segments will be used for generator-relocated programs, the generator aborts, and the request for # OF BLANK ID SEGMENTS? is not displayed.

Otherwise the request is redisplayed if the limit is exceeded after the user specifies the number of blank ID segments (meaning that the total of the number of ID segments to be used at generation time, plus the number of blank ID segments specified by the user is greater than 254).

Action: Either enter valid response or reduce the number of programs.

GEN ERR 61

Meaning: Physical memory overflow (number of pages declared exceeded).

Action: Irrecoverable error. Rerun the On-Line Generator program and revise your answer file.

GEN ERR 62

Meaning: Invalid instruction reference to an EMA symbol -- an instruction either references the symbol with offset or with indirect.

Action: Violating instruction will be NOP'ed for this relocation. Revise program before next relocation. Message printed on list device only; control is not transferred to the user console.

Appendix H

RTE-IV Program Types

Table H-1 provides a list of the default program types of the libraries and programs distributed with the RTE-IV operating system. The default program type is listed in the first column, and the remaining columns list the additional available program types. Each row of the table lists a program name or a library file name and indicates whether or not the corresponding program types available are allowed for that respective program or library (a "YES" meaning that the listed type is allowed, a "NO" meaning that the listed type is not allowed).

Note that several of the listed spool modules require SSGA access.

Table H-1. RTE-IV Program Types

PROGRAM OR LIBRARY FILE NAME	DEFAULT TYPE	TYPE 1 without TA II	TYPE 1 with TA II	TYPE 2	TYPE 3	TYPE 4	SSGA REQUIRED*
LOADR	4	NO	NO	YES	YES	YES	NO
PRMPT	1	YES	YES	YES	YES	YES	NO
RSPNS	1	YES	YES	YES	YES	YES	NO
AUTOR	2	YES	YES	YES	YES	YES	NO
\$CNFX	3	NO	NO	NO	YES	NO	NO
WHZAT	1	YES	YES	YES	YES	YES	NO
LGTAT	3	YES	YES	YES	YES	YES	NO
RT4GN	3	NO	NO	YES	YES	YES	NO
SWTCH	3	NO	NO	YES	YES	YES	NO
FMGR	3	NO	NO	YES	YES	NO	NO
D RTR	2	YES	YES	YES	YES	YES	NO
EDITR	3	NO	NO	YES	YES	NO	NO
XREF	3	NO	NO	YES	YES	NO	NO
FTN4	3	NO	NO	YES	YES	NO	NO
ASMB	3	NO	NO	YES	YES	NO	NO
KEYS	3	YES	YES	YES	YES	YES	NO
KYDMP	3	YES	YES	YES	YES	YES	NO
#EMA	3	NO	NO	YES	YES	YES	NO
LSAVE	4	YES	YES	YES	YES	YES	NO
USAVE	4	YES	YES	YES	YES	YES	NO
RESTR	4	YES	YES	YES	YES	YES	NO
VERIFY	3	NO	NO	YES	YES	YES	NO
LCOPY	4	YES	YES	YES	YES	YES	NO
MSAFD	3	NO	NO	YES	YES	NO	NO
FORMT	3	YES	YES	YES	YES	YES	NO
SAVE	3	NO	NO	YES	YES	YES	NO
RSTOR	3	NO	NO	YES	YES	YES	NO
COPY	3	NO	NO	YES	YES	YES	NO
JOB	2	NO	NO	YES	YES	NO	NO
GASP	19	NO	NO	NO	YES	NO	YES
SMP	18	NO	YES	YES	YES	NO	YES
EXTND	17	NO	YES	YES	YES	NO	YES
SPOUT	17	NO	YES	YES	YES	NO	YES
RLIB (RTE/DOS Relocatable Library)		YES	YES	YES	YES	YES	NO
BMLIB (Batch Monitor Library)		YES	YES	YES	YES	YES	NO
(Spool Library)		NO	YES	YES	YES	NO	NO
CLIB (Compiler Library)		NO	NO	YES	YES	NO	NO
DECAR (Decimal String Library)		YES	YES	YES	YES	YES	NO
DBUGR (Debug Subroutine)		NO	NO	YES	YES	YES	NO
SYLIB (System Library)		YES	YES	YES	YES	YES	NO

*Add 16 to the desired program type to obtain SSGA access.

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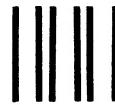
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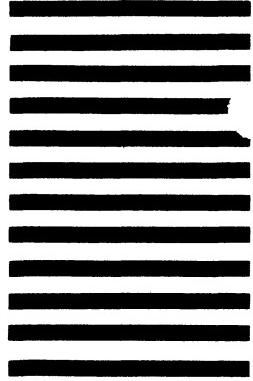
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Hewlett-Packard Italiana S.p.A.	I-40132 BOLOGNA	Yokogawa-Hewlett-Packard Ltd. Mito Mitsui Building 1-4-73, San-no-maru	Photo & Cine Equipment P.O. Box 270 Safat KUWAIT Tel: 42-2846, 42-3801 Telex: 22247 Matin-KT P	ECISA Taihe 229, Piso 10 Polanco MEXICO D.F. 11570 Tel: 250-5391 Telex: 17-72755 ECE ME M	NORWAY Hewlett-Packard Norge A/S Folke Bernadottes vei 50 P.O. Box 3558 N-5033 FYLLINGSDALEN (Bergen) Tel: (05) 16-55-40 Telex: 16621 hpnas n CH,CS,E,MS
Hewlett-Packard Italiana S.p.A.	I-95126 CATANIA	MITO, Ibaragi 310	LEBANON G.M. Dolmadianian Achrafieh P.O. Box 165. 167	MOROCCO Dolbeau 81 rue Karatchi CASABLANCA Tel: 3041-82, 3068-38 Telex: 23051, 22822 E	Hewlett-Packard Norge A/S Østerndalen 18 P.O. Box 34 N-1345 ÖSTERÅS Tel: (02) 17-11-80 Telex: 16621 hpnas n A,CH,CM,CS,E,M,P
Hewlett-Packard Italiana S.p.A.	Tel: (095) 37-10-87	Tel: (0292) 25-7470	BEIRUT Tel: 290293 MP**	NETHERLANDS Hewlett-Packard Nederland B.V. Van Heuven Goedhartlaan 121 NL 1181KK AMSTELVEEN P.O. Box 667 NL1180 AR AMSTELVEEN Tel: (20) 47-20-21 Telex: 13 216 A,CH,CM,CS,E,MP,P	OMAN Khimji Ramdas P.O. Box 19 MUSCAT Tel: 722225, 745601 Telex: 3289 BROKER MB MUSCAT P
Hewlett-Packard Italiana S.p.A.	Telex: 970291	Yokogawa-Hewlett-Packard Ltd. Sumitomo Seime Nagoya Bldg. 2-14-19, Meieki-Minami, Nakamura-ku	LUXEMBOURG Hewlett-Packard Belgium S.A./N.V. Blvd de la Woluwe, 100		
Hewlett-Packard Italiana S.p.A.	C,P	NAGOYA, 450 Aichi	Woluwedal		
Hewlett-Packard Italiana S.p.A.	I-20063 CERNUSCO SUL NAVIGLIO	Tel: (052) 571-5171	B-1200 BRUSSELS		
Hewlett-Packard Italiana S.p.A.	Tel: (02) 903691	CH,CM,CS,E,MS	Tel: (02) 762-32-00		
Hewlett-Packard Italiana S.p.A.	Telex: 334632	Yokogawa-Hewlett-Packard Ltd. Chuo Bldg., 4th Floor	Telex: 23-494 paloben bru		
Hewlett-Packard Italiana S.p.A.	A,CH,CM,CS,E,MP,P	5-4-20 Nishinakajima, Yodogawa-ku	A,CH,CM,CS,E,MP,P		
Hewlett-Packard Italiana S.p.A.	Via Nuova San Rocco a	OSAKA, 532			
Hewlett-Packard Italiana S.p.A.	Capodimonte, 62/A	Tel: (06) 304-6021			
Hewlett-Packard Italiana S.p.A.	I-80131 NAPLES	Telex: YHPOSA 523-3624			
Hewlett-Packard Italiana S.p.A.	Tel: (081) 7413544	A,CH,CM,CS,E,MP,P*			
Hewlett-Packard Italiana S.p.A.	Telex: 710698	Yokogawa-Hewlett-Packard Ltd. 1-27-15, Yabe,			
Hewlett-Packard Italiana S.p.A.	A,CH,E	SAGAMIHARA Kanagawa, 229			
Hewlett-Packard Italiana S.p.A.	Viale G. Modugno 33	Tel: 0427 59-1311			
Hewlett-Packard Italiana S.p.A.	I-16156 GENOVA PEGLI	Yokogawa-Hewlett-Packard Ltd. Shinjuku Dai-ichi Seime 6F			
Hewlett-Packard Italiana S.p.A.	Tel: (010) 68-37-07	2-7-1, Nishi Shinjuku			
Hewlett-Packard Italiana S.p.A.	Telex: 215238	Shinjuku-ku, TOKYO 160			
Hewlett-Packard Italiana S.p.A.	E,C	Tel: 03-348-4611-5			
Hewlett-Packard Italiana S.p.A.	Viale G. Modugno 33	CH,E			
Hewlett-Packard Italiana S.p.A.	I-16156 GENOVA PEGLI				
Hewlett-Packard Italiana S.p.A.	Tel: (010) 68-37-07				
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Hewlett-Packard Italiana S.p.A.	E,C				



SALES & SUPPORT OFFICES

Arranged Alphabetically by Country

Suhail & Saud Bahwan
P.O. Box 169
MUSCAT
Tel: 734 201-3
Telex: 3274 BAHWAN MB

PAKISTAN
Mushko & Company Ltd.
1-B, Street 43
Sector F-8/1
ISLAMABAD
Tel: 26875
Cable: FEMUS Rawalpindi
A,E,M
Mushko & Company Ltd.
Osman Chambers
Abdullah Haroon Road
KARACHI 0302
Tel: 511027, 512927
Telex: 2894 MUSKO PK
Cable: COOPERATOR Karachi
A,E,M,P*

PANAMA
Electrónico Balboa, S.A.
Calle Samuel Lewis, Ed. Alfa
Apartado 4929
PANAMA 5
Tel: 64-2700
Telex: 3483 ELECTRON PG
A,CM,E,M,P
Foto Internacional, S.A.
Colon Free Zone
Apartado 2068
COLON 3
Tel: 45-2333
Telex: 8626 IMPORT PG
P

PERU
Cía Electro Médica S.A.
Los Flamencos 145, San Isidro
Casilla 1030
LIMA 1
Tel: 41-4325, 41-3703
Telex: Pub. Booth 25306
A,CM,E,M,P

PHILIPPINES
The Online Advanced Systems Corporation
Rico House, Amorsolo Cor. Herrera Street
Legaspi Village, Makati
P.O. Box 1510
Metro MANILA
Tel: 85-35-81, 85-34-91, 85-32-21
Telex: 3274 ONLINE
A,CH,CS,E,M
Electronic Specialists and Proponents Inc.
690-B Epifanio de los Santos Avenue
Cubao, QUEZON CITY
P.O. Box 2649 Manila
Tel: 98-96-81, 98-96-82, 98-96-83
Telex: 40018, 42000 ITT GLOBE
MACKAY BOOTH
P

PORTUGAL
Mundinter
Intercambio Mundial de Comercio S.a.r.l
P.O. Box 2761
Av. Antonio Augusto de Aguiar 138
P-LISBON
Tel: (19) 53-21-31, 53-21-37
Telex: 16691 munter p
M

Soquimica
Av. da Liberdade, 220-2
1298 LISBON Codex
Tel: 56 21 81/2/3
Telex: 13316 SABASA P
Telecra-Empresa Técnica de Equipos Eléctricos S.a.r.l.
Rua Rodrigo da Fonseca 103
P.O. Box 2531
P-LISBON 1
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Telex: 12598
CH,CS,E,P

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Hewlett-Packard Puerto Rico
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Urb. Country Club
RIO PIEDRAS, Puerto Rico 00924
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A,CH,CS

QATAR
Nasser Trading & Contracting
P.O. Box 1563
DOHA
Tel: 22170, 23539
Telex: 4439 NASSER DH
M
Computearbia
P.O. Box 2750
DOHA
Tel: 883555
Telex: 4806 CHPARB
P
Eastern Technical Services
P.O. Box 4747
DOHA
Tel: 329 993
Telex: 4156 EASTEC DH

SAUDI ARABIA
Modern Electronic Establishment
Hewlett-Packard Division
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Thuobah
AL-KHOBAR
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CH,CS,E,M,P
Modern Electronic Establishment
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Telex: 402712 FARNAS SJ
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SINGAPORE 0511
Tel: 631788
Telex: HPSGSO RS 34209
Cable: HEWPACK, Singapore
A,CH,CS,E,MS,P
Dynamar International Ltd.
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SINGAPORE 1334
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Telex: RS 26283
CM

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Hewlett-Packard So Africa (Pty.) Ltd.
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Pinelands
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Hewlett-Packard So Africa (Pty.) Ltd.
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Hewlett-Packard So Africa (Pty.) Ltd.
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511 Cape Road
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CH

Hewlett-Packard So Africa (Pty.) Ltd.
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Constandia Park Ridge Shopping Centre
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Tel: 982043
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CH,E
Hewlett-Packard So Africa (Pty.) Ltd.
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Telex: 4-20877
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Hewlett-Packard Española S.A.
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A,CH,CS,E,MS,P

Hewlett-Packard Española S.A.
Calle Jerez 3
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Telex: 23515 hpe
A,CH,E

Hewlett-Packard Española S.A.
c/o Costa Brava 13
Colonia Mirasierra
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Hewlett-Packard Española S.A.
Av Ramón y Cajal 1-9
Edificio Sevilla 1,
E-SEVILLA 5
Tel: 64-44-54, 64-44-58
Telex: 72933
A,CS,MS,P
Hewlett-Packard Española S.A.
C/Ramon Gordillo, 1 (Entlo.3)
E-VALENCIA 10
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CH,P

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Hewlett-Packard Sverige AB
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Telex: (854) 17886 (via SPÅNGA office)
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Hewlett-Packard Sverige AB
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Hewlett-Packard (Schweiz) AG
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CH
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CH-1202 GENEVA
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Hewlett-Packard (Schweiz) AG
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CH-1219 LE LIGNON-Geneva
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Telex: 27333 hpag ch
Cable: HEWPACKAG Geneva
A,E,MS,P
Hewlett-Packard (Schweiz) AG
Allmend 2
CH-8967 WIDEN
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Telex: 53933 hpag ch
Cable: HPAG CH
A,CH,CM,CS,E,MS,P

SYRIA
General Electronic Inc.
Nuri Basha
P.O. Box 5781
DAMASCUS
Tel: 123-24-87
Telex: 11216 ITIKAL SY
Cable: ELECTROBOR DAMASCUS E

Middle East Electronics
Place Azmé
Boîte Postale 2308
DAMASCUS
Tel: 334592
Telex: 11304 SATACO SY
M,P

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CH,CS,E
Hewlett-Packard Far East Ltd.
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Cable:HEWPACK Taipei
A,CH,CM,CS,E,M,P
Ing Lih Trading Co.
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TAIPEI 100
Tel: (02) 3948191
Cable: INGLIH TAIPEI A

THAILAND
Unimesa
30 Patpong Ave., Suriwong
BANGKOK 5
Tel: 234 091, 234 092
Telex: 84439 Simonco TH
Cable: UNIMESA Bangkok
A,CH,CS,E,M
Bangkok Business Equipment Ltd.
5/5-6 Dejo Road
BANGKOK
Tel: 234-8670, 234-8671
Telex: 87669-BEQUIPT TH
Cable: BUSIQUIPT Bangkok P

TRINIDAD & TOBAGO
Caribbean Telecoms Ltd.
50/A Jerningham Avenue
P.O. Box 732
PORT-OF-Spain
Tel: 62-44213, 62-44214
Telex: 235,272 HUGCO WG
A,CM,E,P

TUNISIA
Tunisie Electronique
31 Avenue de la Liberté
TUNIS
Tel: 280-144
E,P
Corema
1 ter. Av. de Carthage
TUNIS
Tel: 253-821
Telex: 12319 CABAM TN M

TURKEY
Teknrim Company Ltd.
Iran Caddesi No. 7
Kavaklıdere, ANKARA
Tel: 275800
Telex: 42155 TKNM TR E
E.M.A.
Medina Eldem Sokak No.41/6
Yuksel Caddesi
ANKARA
Tel: 175 622
M

UNITED ARAB EMIRATES
Emilac Ltd.
P.O. Box 1641
SHARJAH
Tel: 354 121, 354 123
Telex: 68136 Emilac Sh
CH,CS,E,M,P



UNITED KINGDOM	Hewlett-Packard Co. P.O. Box 15976 (95813) 4244 So. Market Court, Suite A SACRAMENTO, CA 95834 Tel: (916) 929-7222 A*,CH,CS,E,MS	Hewlett-Packard Co. 6425 N. Pensacola Blvd. Suite 4, Building 1 P.O. Box 12826 PENSACOLA, FL 32575 Tel: (904) 476-8422 A,MS	Kansas Hewlett-Packard Co. 1644 S. Rock Road WICHITA, KA 67207 Tel: (316) 684-8491 CH	Hewlett-Packard Co. P.O. Box 27307 1024 Executive Parkway ST. LOUIS, MO 63141 Tel: (314) 878-0200 A,CH,CS,E,MP
NORTHERN IRELAND				Effective September 1982: 13001 Hollenberg Drive BRIDGETON, MO 63044
SCOTLAND				
UNITED STATES				
Alabama	Hewlett-Packard Co. 900 Century Park South Suite 128 BIRMINGHAM, AL 35226 Tel: (205) 822-6802 CH,MP	Hewlett-Packard Co. 9606 Aero Drive P.O. Box 23333 SAN DIEGO, CA 92123 Tel: (714) 279-3200 CH,CM,CS,E,MP	Hewlett-Packard Co. 57508 N. Hoover Blvd., Suite 123 TAMPA, FL 33614 Tel: (813) 884-3282 A*,CH,CM,CS,E*,M*	Kentucky Hewlett-Packard Co. 10300 Linn Station Road Suite 100 LOUISVILLE, KY 40223 Tel: (502) 426-0100 A,CH,CS,MS
	Hewlett-Packard Co. P.O. Box 4207 8290 Whitesburg Drive, S.E. HUNTSVILLE, AL 35802 Tel: (205) 881-4591 CH,CM,CS,E,M*	Hewlett-Packard Co. 2305 Camino Ramon "C" SAN RAMON, CA 94583 Tel: (415) 838-5900 CH,CS	Hewlett-Packard Co. P.O. Box 105005 ATLANTA, GA 30348 2000 South Park Place ATLANTA, GA 30339 Tel: (404) 955-1500 Telex: 810-766-4890 A,CH,CM,CS,E,MP	Louisiana Hewlett-Packard Co. 8126 Calais Bldg. BATON ROUGE, LA 70806 Tel: (504) 467-4100 A**,CH**
	Hewlett-Packard Co. 1577 "C" Street, Suite 252 ANCHORAGE, AK 99501 Tel: (907) 276-5709 CH*	Hewlett-Packard Co. Fullerton, CA 92631 363 Brookhollow Drive SANTA ANA, CA 92705 Tel: (714) 641-0977 A,CH,CM,CS,MP	Hewlett-Packard Co. P.O. Box 816 (80903) 2531 Center West Parkway Suite 110 AUGUSTA, GA 30904 Tel: (404) 736-0592 MS	Hewlett-Packard Co. P.O. Box 1449 KENNER, LA 70062 160 James Drive East DESTAHAH, LA 70047 Tel: (504) 467-4100 A,CH,CS,E,MS
Alaska	Hewlett-Packard Co. 1577 "C" Street, Suite 252 ANCHORAGE, AK 99501 Tel: (907) 276-5709 CH*	Hewlett-Packard Co. 5553 Hollister SANTA BARBARA, CA 93111 Tel: (805) 964-3390 Hewlett-Packard Co. 3003 Scott Boulevard SANTA CLARA, CA 95050 Tel: (408) 988-7000 A,CH,CM,CS,E,MP	Hewlett-Packard Co. 200-E Montgomery Cross Rd. SAVANNAH, GA 31401 Tel: (912) 925-5358 CH**	Maryland Hewlett-Packard Co. 7121 Standard Drive HANOVER, MD 21076 Tel: (301) 796-7700 Telex: 710-862-1943 Eff. Dec. 1, 1982 3701 Koppers St. BALTIMORE, MD 21227 Tel: (301) 644-5800 A,CH,CM,CS,E,MS
	Hewlett-Packard Co. 2424 East Aragon Road TUCSON, AZ 85706 Tel: (602) 889-4631 CH,ES**	Hewlett-Packard Co. 5703 Corsa Avenue WESTLAKE VILLAGE, CA 91362 Tel: (213) 706-6800 E*,CH*,CS*	Hewlett-Packard Co. P.O. Box 2103 WARNER ROBINS, GA 31099 1172 N. Davis Drive WARNER ROBINS, GA 31093 Tel: (912) 923-8831 E	Hewlett-Packard Co. 2 Choke Cherry Road ROCKVILLE, MD 20850 Tel: (301) 948-6370 A,CH,CM,CS,E,MP
Arkansas	Hewlett-Packard Co. P.O. Box 5646 Brady Station LITTLE ROCK, AR 72215 111 N. Filmore LITTLE ROCK, AR 72205 Tel: (501) 664-8773, 376-1844 MS	Colorado Hewlett-Packard Co. 24 Inverness Place, East ENGLEWOOD, CO 80112 Tel: (303) 771-3455 Telex: 910-935-0785 A,CH,CM,CS,E,MS	Hewlett-Packard Co. Kawaihao Plaza, Suite 190 567 South King Street HONOLULU, HI 96813 Tel: (808) 526-1555 A,CH,E,MS	Massachusetts Hewlett-Packard Co. 32 Hartwell Avenue LEXINGTON, MA 02173 Tel: (617) 861-8960 A,CH,CM,CS,E,MP
	Hewlett-Packard Co. 47 Barnes Industrial Road South P.O. Box 5007 WALLINGFORD, CT 06492 Tel: (203) 265-7801 A,CH,CM,CS,E,MS	Connecticut Hewlett-Packard Co. 1100 31st Street, Suite 100 DOWNTOWN GROVE, IL 60515 Tel: (309) 662-9411 CH,MS**	Hewlett-Packard Co. 5201 Tolview Drive ROLLING MEADOWS, IL 60008 Tel: (312) 255-9800 A,CH,CM,CS,E,MP	Michigan Hewlett-Packard Co. 23855 Research Drive FARMINGTON HILLS, MI 48024 Tel: (313) 476-6400 A,CH,CM,CS,E,MP
California	Hewlett-Packard Co. 99 South Hill Dr. BRISBANE, CA 94005 Tel: (415) 330-2500 CH,CS	Florida Hewlett-Packard Co. P.O. Box 24210 (33307) 2901 N.W. 62nd Street FORT LAUDERDALE, FL 33307 Tel: (305) 973-2600 CH,CS,E,MP	Hewlett-Packard Co. 5201 Tolview Drive ROLLING MEADOWS, IL 60008 Tel: (312) 255-9800 A,CH,CM,CS,E,MP	Hewlett-Packard Co. 4326 Cascade Road S.E. GRAND RAPIDS, MI 49056 Tel: (616) 957-1970 CH,CS,MS
	Hewlett-Packard Co. 5060 Clinton Avenue FRESNO, CA 93727 Tel: (209) 252-9652 MS	Hewlett-Packard Co. 4080 Woodcock Drive, #132 Brownett Building JACKSONVILLE, FL 32207 Tel: (904) 398-0663 C*,E*,MS**	Hewlett-Packard Co. 1776 22nd Street, Suite 1 WEST DES MOINES, IA 50265 Tel: (515) 224-1435 CH,MS**	Minnesota Hewlett-Packard Co. 2025 W. Larpetine Ave. ST. PAUL, MN 55113 Tel: (612) 644-1100 A,CH,CM,CS,E,MP
	Hewlett-Packard Co. 1430 East Orangethorpe FULLERTON, CA 92631 Tel: (714) 870-1000 CH,CM,CS,E,MP	Hewlett-Packard Co. 1101 W. Hibiscus Ave., Suite E210 MELBOURNE, FL 32901 Tel: (305) 729-0704 E*	Hewlett-Packard Co. 1776 22nd Street, Suite 1 WEST DES MOINES, IA 50265 Tel: (515) 224-1435 CH,MS**	Mississippi Hewlett-Packard Co. 1675 Lakeland Drive JACKSON, MS 39216 Tel: (601) 982-9363 MS
	Hewlett-Packard Co. 320 S. Kellogg, Suite B GOLETA, CA 93117 Tel: (805) 967-3405 CH	Hewlett-Packard Co. 2415 Heinz Road IOWA CITY, IA 52240 Tel: (319) 351-1020 CH,E*,MS	Hewlett-Packard Co. 2415 Heinz Road IOWA CITY, IA 52240 Tel: (319) 351-1020 CH,E*,MS	Missouri Hewlett-Packard Co. 11131 Colorado Avenue KANSAS CITY, MO 64137 Tel: (816) 763-8000 A,CH,CM,CS,E,MS
	Hewlett-Packard Co. 5400 W. Rosecrans Boulevard LAWNDALE, CA 90260 P.O. Box 92105 LOS ANGELES, CA 90009 Tel: (213) 970-7500 Telex: 910-325-6608 CH,CM,CS,MP	Hewlett-Packard Co. 6177 Lake Ellenor Drive ORLANDO, FL 32809 Tel: (305) 859-2900 A,CH,CM,CS,E,MS		
	Hewlett-Packard Co. 3200 Hillview Avenue PALO ALTO, CA 94304 Tel: (415) 857-8000 CH,CS,E			



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Arranged Alphabetically by Country

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C,M

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